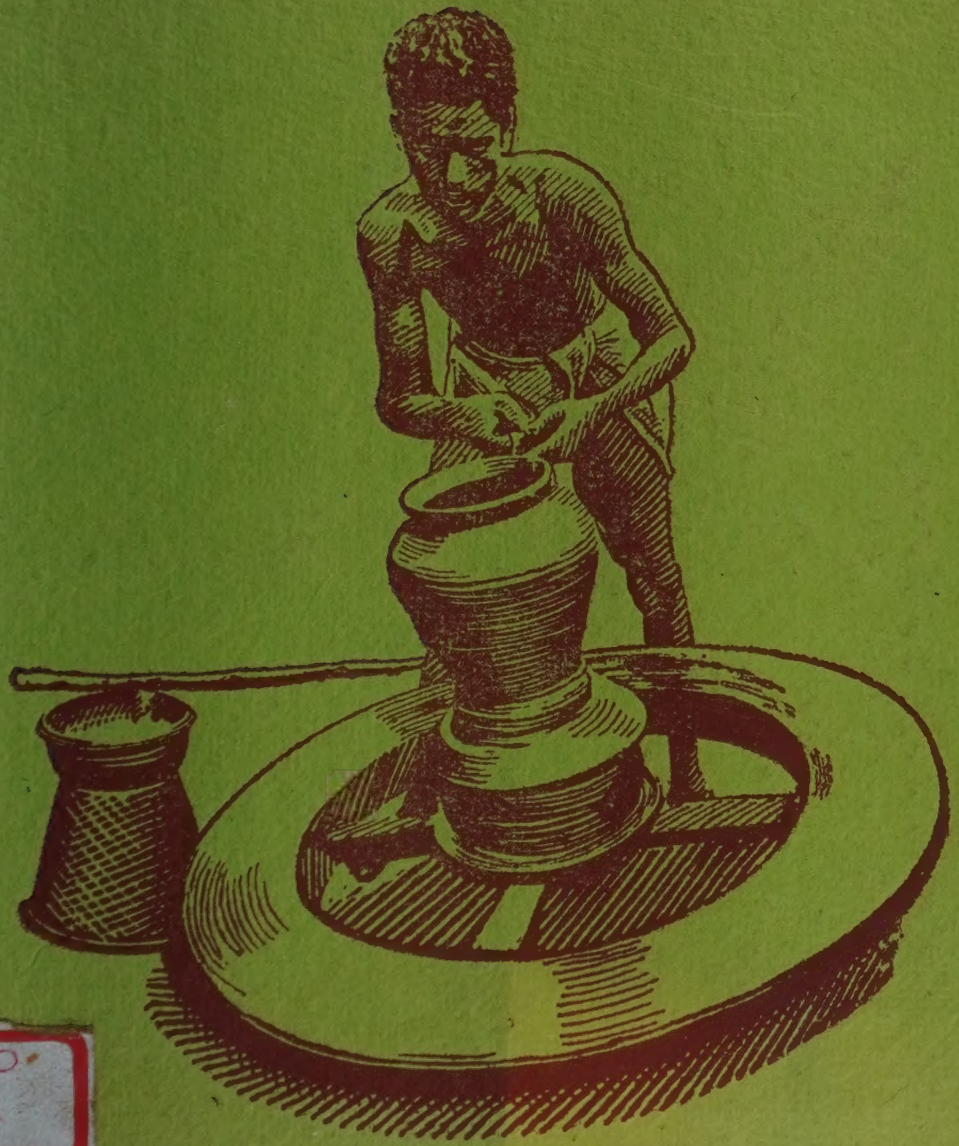
# POTTERY PROFILE



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DIRECTORATE OF VILLAGE POTTERY INDUSTRY
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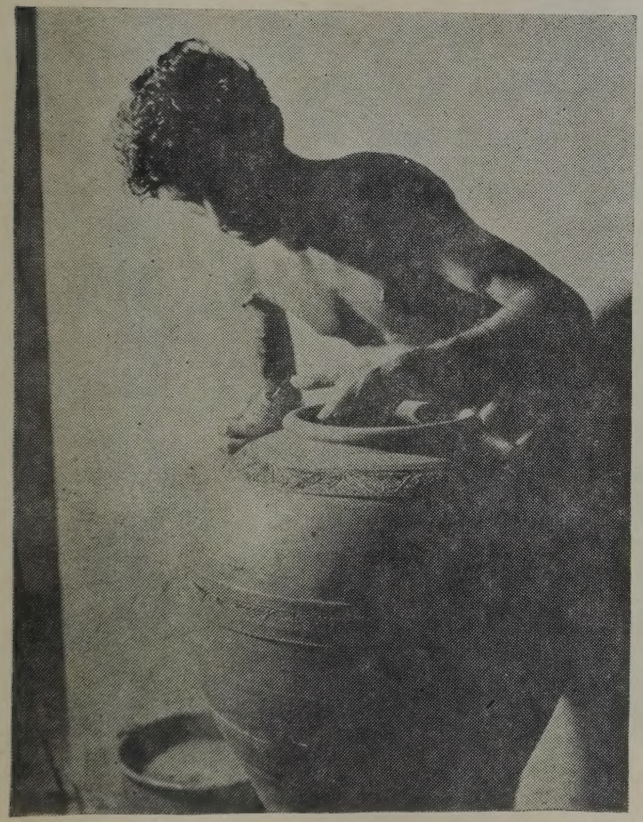
Beating pots to shape after throwing on the wheel. The pride of Indian Potters.

Ravi Narayan

# POTTERY PROFILE

Fig. No. 1

## COMMUNITY HEALTH CELL



*Shaping a pot on the wheel is a joy for the Potter and those who look at it. Decoration devices are many. Here the engraved pottery roller is applied on the pot in the making to get the impression.* **Here is a stable improved potters' wheel.**

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KHADI AND VILLAGE INDUSTRIES COMMISSION

कामये दुःखतप्तानाम्।
प्राणिनाम् आर्तिनाशनम्॥

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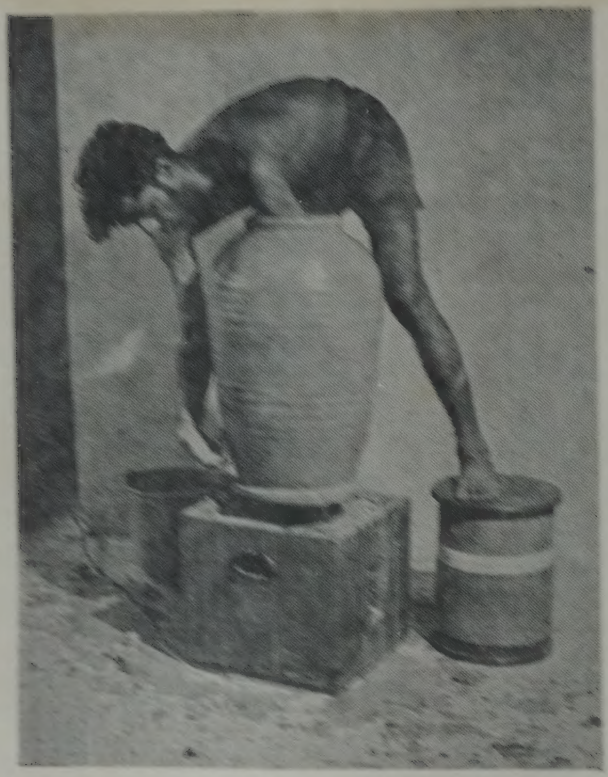

Fig. No. 2.

**Shaila electric potters' wheel** with just 1/8 H. P. geared motor allows 30 kg. stiff plastic clay thrown into one large pot. Lakhs of Indian potters have the skill and here is the improved equipment for them.

P A-400

# FOREWORD

The wheel rotates. The man bends double. His ribs stiffen. His fingers manipulate the lump of clay. Beautiful articles are born leaving the creator in misery and poverty. His wares travel to millions of hearths and homes more indigent than himself. This is the story of the potter in India. They number over a million. Their skill should be preserved. Their modes of production should undergo revolutionary changes. Their products should be bought both by the poor and the affluent. The endeavour of the Khadi Commission is to do this. This booklet attempts to tell how the potter can enrich the community and enrich himself. If even a hundred thousand potters benefit by what is stated in the pamphlet it would have served its purpose. More than any one else, the technical staff associated with the development of pottery should give this booklet a careful reading and do everything within their means to take improved tools, better techniques, financial aid and other services to the potters in large numbers in the coming years.

T. S. BHARDE
VICE-CHAIRMAN
KHADI & VILLAGE INDUSTRIES COMMISSION

March 18, 1975
BOMBAY-400 056.

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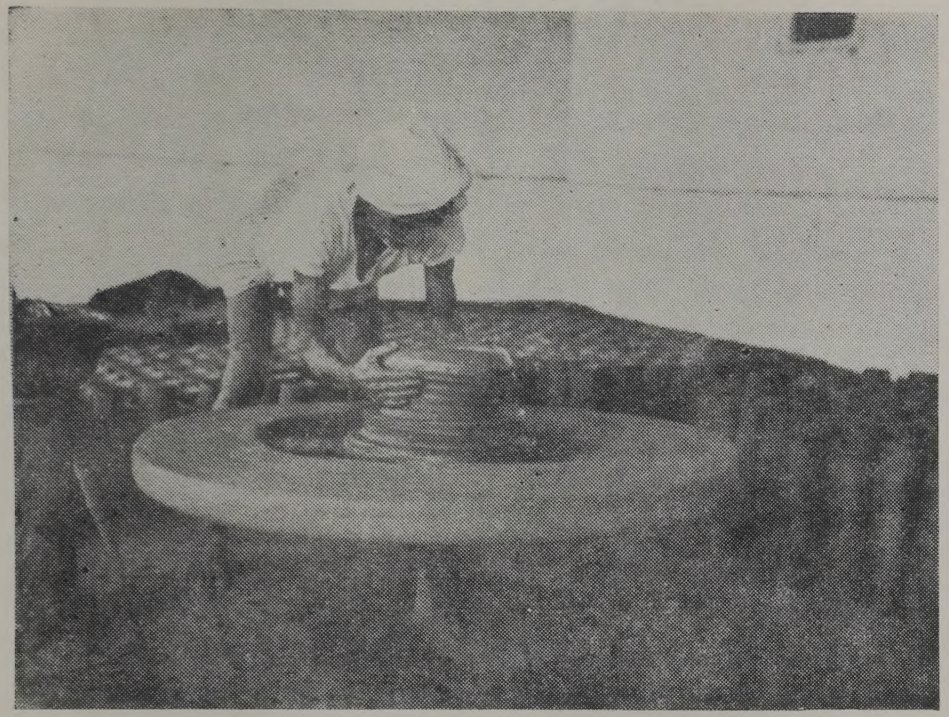

Fig. No. 3

Fig. No. 4

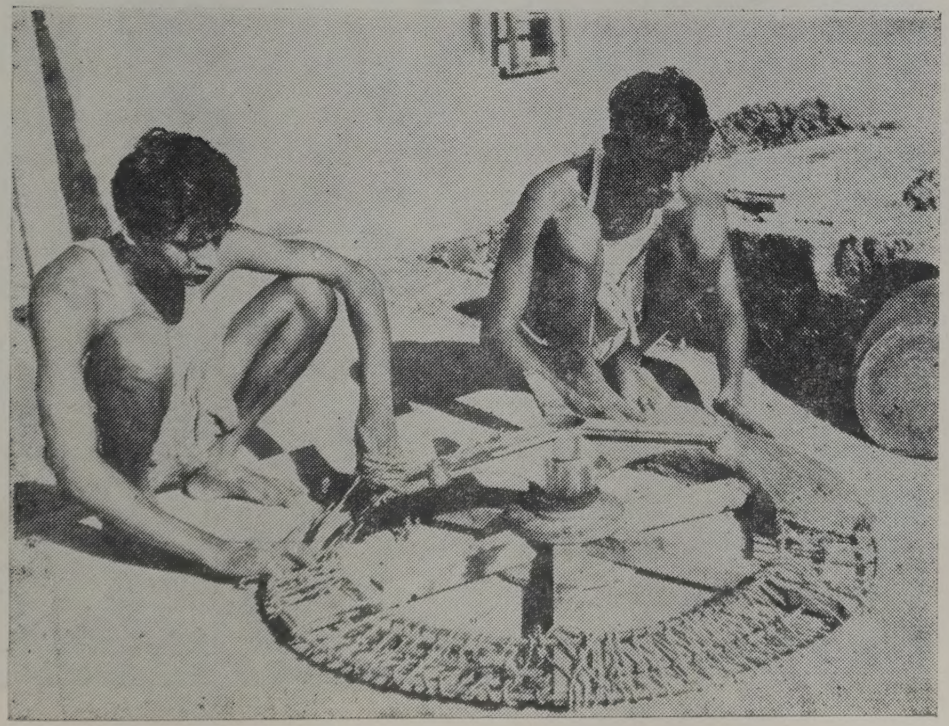

Fig. No. 5

(Fig. No. 3) **A country potters wheel** (*Karnatataka*) *used for making roofing tiles.*

(Fig. No. 4) **Traditional potters wheel** *with wooden frame as is used in Goa. The back of the wheel and the wooden niple are seen here.*

(Fig. No. 5) **Improved potters wheel** *making the fly wheel with reinforcement, keeping the wheel up side down.*

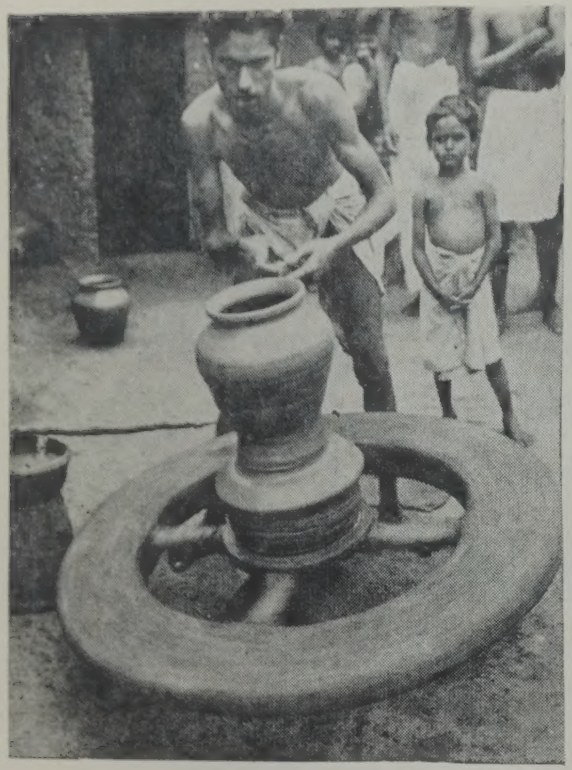

*Fig. No. 6*

**Traditional potters wheel** *serves well for pots and pans to be finished by the beating process*

*The* **push and pull wheel** *is drudgery for the helper.*

*Fig. No. 7*

## WHAT IS POTTERY?

Pottery is an ancient craft and its origin is unknown and legendary. We find mention about potters and pottery in the Vedas and Upanishads. The excavations in the Nile valley produced samples of pottery which were estimated to have been made nearly 11,000 years B. C. When once the potentialities of clay had been discovered various methods were developed for using clay for thousands of years. In different countries, this ancient craft flourished from time to time. The Chinese porcelain was the most coveted pottery ware for even the Westerners for whom that technique remained a mystery for a long time Now the Japanese excel all other countries in making true porcelain.

In india there is evidence that all manner of most refined sanitary equipments was produced about 2,000 B.C. while the Romans too at a later date showed remarkable ingenuity in this field.

### What is Pottery and what is Clay?

CLAY IS DECOMPOSED ROCK, WHEREAS POTTERY IS ROCKYFIED CLAY. Clay is formed from the decomposition of the felspathic rock by the corrosion and erosion action of air and water. Pure clay is a combination of allumina, silica and chemically compounded water.

From potters point of view pottery is classified into the following categories.

(1) TERRA-COTTA :- From out of common clays whatever is formed, dried and fired hard into utility articles come under this category. Thus pots and pans, bricks and tiles, pipes and all those wares that are unglazed and fired at about 900°C is Terracotta.

2) EARTHEN WARE :- Either with common clay or white-burning clays whatever pottery is fired between 950°C and 1,150°C is termed as earthenware. Generally it is glazed, rendering the porous body impervious on the surface.

3) STONEWARE :- Pottery fired in the range of 1,250°C to 1,300°C and which are almost impervious ( less than 3% porosity ) come under stoneware pottery. These may be glazed or unglazed.

4) PORCELAIN :- Pottery that is fired at 1,300°C or above comes, under this category. There is the semi-porcelain and the true or hard porcelain. Generally porcelain in thin wares are translucent and they are as a rule vitrified and the clay body and the glaze fluid mix together and become translucent.

Pottery can be defined in a simple way as that craft in which clay with or without other admixtures is shaped, dried and fired dense. Functionally the classification can be many but a few types are given below :- 1) pots and pans, 2) bricks, 3) roofing tiles, 4) flooring tiles, 5) pipes, 6) stoneware jars and toys and crockery, 7) insulators, 8) Electrical pottery goods, 9) insulation bricks, 10) fire-bricks, 11) all kinds of decorative and utility wares.

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Two ballbearings are used in the improved potters' wheel. (SKF 6205 or NBC 125.).

Broken pottery pieces can be ground and converted into grog and can be mixed with clay to reduce the plasticity.

## POTTERS' WHEELS.

### Push and Pull Wheel.

The potters' wheel was the most vital invention of potters which probably took place independently in various parts of the world, it is said, some were around 3500 B. C. Out of the earliest wheels one design was of a wheel with a conical stone-bearing of 3 inches base and 3 inches height and it worked with the push and pull force of the two hands of a helper, seated opposite the potter, who could command for the required speed as seen in fig. No. 8. This is even now in use amongst potters in the Southern most districts of India, Tirunelveli, Madurai and Trivandrum.

### Stone-Wheel.

The other type was a 3 feet diameter stone, of about 4 inches thickness, turning on a pointed pivot of hard wood, resting at the bottom centre of the wheel with a 1/3rd spherical highly polished depression of about 1/3rd inch diameter. With a few drops of oil the highly polished stone and hard wood offer a very good bearing, with minimum friction and the fly wheel could take the required energy when it was spun by the stick in a slot cupped in the circumference of the fly wheel. The momentum acquired by the wheel was just manageable by the potter for shaping a few small pieces of average size pot and for a big pot, it requires rotating the wheel more than once. The stone-wheel in operation can be seen at Fig. 16. Stone-wheels are even now popular in Punjab, Uttar Pradesh Bihar, Rajasthan, Jammu & Kashmir and Madhya Pradesh. This wheel is now being made in cement concrete also.

### Traditional Potters' Wheel :-

Instead of the stone, potters in India found it simple to have a wooden frame with the central circular wheel-head. At the circumference, with a reinforcement of string and split bamboo, the fly-wheel is prepared in clay with some fibre mixed with it. The wheel is made with almost local raw materials and labour and talents in remote villages in India. This is the cheapest, and for the skilled potter, a good enough wheel for making pots and pans which do not require turning. This wheel in operation may be seen at Fig. 3. This wheel is popular in almost all parts of India except in the Southern-most districts.

### Kick-Wheel.

There is another traditional wheel used by mostly the Muslim potters of the north. This is a kick-wheel. The potter goes on kicking the surface of the wooden fly-wheel keeping both his hands free for attending to the shaping clay on the wheel-head. The kick-wheel is generally burried underground in a pit of about 3 feet diameter and 4 feet depth. The wheel consists of a wooden spindle of 5 feet height, $2\frac{1}{2}$ in diameter. A wooden fly-wheel of $2\frac{1}{2}$ feet diameter through which the spindle passes is located at 1 ft. height from the bottom. The Spindle passes

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If the glaze is uneven, crawled, crackled or if there are more number of pin holes the same ware can be redipped in different colour glaze and fired. This will make the ware stronger and attractive and can be sold at a higher price.

*Fig. No. 8*

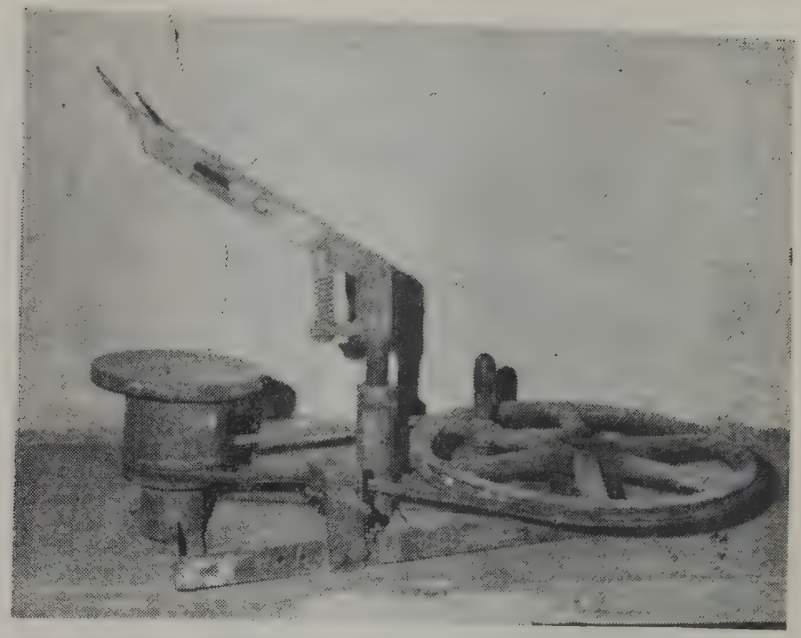

*Fig. No. 9*

*Fig No. 10*

*(Fig. No. 8)* *The* **push and pull wheel** *has stone bearings as seen here.*

*(Fig. No. 9)* **V-Belt driven wheel** *with jigger and jolley arrangement is another improvement.*

*(Fig. No. 10)* **Push-and-pull potters' wheel** *of ancient design. The helper pushes and pulls the wheel at the circumference at the potters' command.*

*Fig. No. 11*

**The treadle wheel** *has been popular with self-employed potters in western countries.*

**Kick wheel** *above ground. Generally this wheel is used underground without table.*

*Fig. No. 12*

through a wooden plank kept across the kick wheel pit at ground level for the potter to sit on one side and for the spindle to rotate with an improvised straw bearing, lubricated by oil. At the top of the spindle there is a wheel head, a wooden block. The potter comfortably seated on the plank at ground level can rest one of his legs on a wooden strip, fixed somewhere above the fly-wheel and with the other leg he kicks the fly-wheel, imparting motion for the wheel. The spindle rotates, resting at the bottom in a small pit of polished depression in stone or iron. The spindle-bottom is conical and pointed with an iron socket. The kick wneel has been made later on in iron and it is worked above ground with other improvements. The cost of the original kick wheel was very low and it was possible to make the same by the village carpenter. A kick-wheel in operation can be seen in Fig. No. 12.

**Improved potters' wheel with ball bearings.**

In order to offer the potter the advantages of a scientific approach to simple improvements, keeping the traditional style of the equipment, to enable him to continue his age-old habits and manners, a potters' wheel was developed by the Khadi and Village Industries Commission. This wheel has a tripod iron-stand with a compact housing for ball-bearings, 2 sets of ball bearings, MS rod and iron-flange for the wheel-head. Wooden or iron spokes are provided for making the fly-wheel in the traditional way, either with clay or with cement-concrete. This wheel does not wobble. It is safe to handle and is getting more and more popular amongst the potters for sturdy work, involving turning etc. This wheel in operation can be seen in Fig. Nos. 1 and 47

**Declutching wheel.**

Declutching wheel of almost the same design as the Improved potters' wheel with ball bearings, is another design. The salient feature in this is to declutch the wheel-head, allowing the fly-wheel to continue to rotate, when the wheel-head with the ware is stopped for decoration or for other purposes. Thus, the energy imparted for keeping the fly-wheel in motion is not lost from time to time whenever the wheel-head has to be stopped for attention. This can be seen in Fig. No. 54.

**Rope-driven wheel.**

Rope-driven wheel, having a helper for the potter to keep the spindle with the wheel-head rotated, a wheel-frame occupying somewhat larger space is devised. It has certain advantages over the push and pull wheel, but as it requires a helper, it is less popular. It can be seen at Fig. No. 20

**Belt-driven wheel.**

A belt driven wheel, a more compact than the rope-driven wheel, was developed and it can be seen at Fig. No. 9.

**Treadle wheel.**

In Western countries the treadle wheel is popular, as they are accustomed to work in standing position, by a forward and backward motion of the liver by the leg. The fly-wheel and the spindle are kept in motion and it is more advantageous to work on this wheel than on the kick-wheel but the cost of this wheel is very much more than the kick-wheel. This wheel can be seen in Fig. No. 11.

**V Belt-driven wheels in factories.**

Wherever power is utilised for other purposes and where more than one potter is to be seated for the throwing work on potters wheels, by shafting and belting, a number of wheels can be made to rotate. Such a wheel can be seen in Fg. No. 23.

**Gear-driven wheel.**

This is a powerful wheel, driven by hand, but it requires a helper to rotate the fly-wheel. It is laborious but it is still found to be popular amongst the east coast, stoneware jar factories. The wheel in operation can be seen in Fig. No. 22.

**Chain-driven wheel.**

A fly-wheel with spindle is driven with the aid of cycle chain and free-wheel and crank-wheel. The energy of the helper rotating the chain is not wasted as the fly wheel continues to rotate even when the chain stops rotating, when the cranking is stopped by the helper. A view of this wheel is seen in Fig. No. 19.

**Self contained power driven potters wheel.**

With a half H. P. motor and a V-belt, and wheel fixed in a table, some power driven wheels are in use, without any speed regulator. It can be seen in Fg. No. 53.

**Electric wheel with rubber-cone device for regulating speed.**

This is popular in some developed nations. There is the advantage of speed-regulation having a range of 0 to 300 RPM and the disadvantage is that at high speeds the torque suffers considerably, with the result that such a wheel can take a load of only about 5 kilograms.

**"Shaila" Electric Potters wheel.**

This electric potters wheel has certain extraordinary features, not available in any other design found in the market not only in India but abroad. (1) It has only 1/8th H. P. motor. Thus, the power consumption is minimised. (2) The startor in the motor has 3 speed windings, allowing the wheel to rotate with almost the same torque at all the three speeds. (3) This is a powerful wheel with gear arrangement to allow 30 kilograms of clay to be shaped into one single large ware. (4) The wheel is compact in a cube size of 15″ x 15″ x 18″. This wheel can be seen in fig. Nos. 2 & 49. "Shaila" Electric Potters wheel won the national award from the Inventions Promotion Board in 1972.

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Earthen pipe can withstand pressure up to 15 to 17 pounds per square inch.

If the pottery pipeline is laid 2 feet underneath the ground surface and covered by earth properly, fully loaded trucks can pass safely over it.

Green bricks can be used inside the kiln (for low temperature) for false platform, bagwalls etc. After firing, the same can be sold.

Fig. No. 13

Fig. No. 14.

Fig. No. 15

(Fig. No. 13,14&15) **Making Surahis** (to cool water). Two earthen moulds are used. The foot, the neck, the spout and the handle are fixed after joining the two halves.

Fig. No. 16

Fig. No. 17

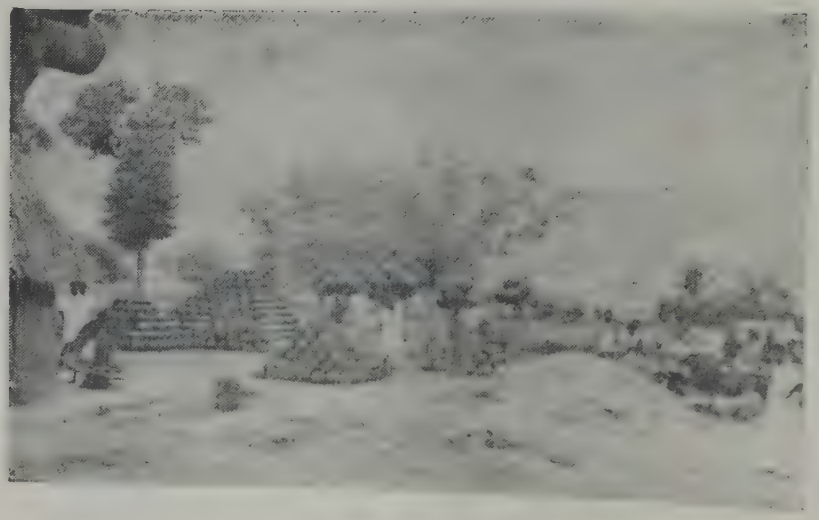

Fig. No. 18

(Fig. No. 16) The **stone-wheel** is used in the northern states. This is from Nizamabad (U. P.)

(Fig. No. 17) **Tandur** is generally used for baking roti in Punjab and U. P.

(Fig. No. 18) Potters of Ammapatti Village near Kodaikanal railway station supply lakhs and lakhs of **pots for packing** fruits grapes, tomatoes, eggs, etc.

## SCHEMES AND PATTERNS OF ASSISTANCE

There has been evolution in the pottery schemes under the Commission for the past 20 years. There are some schemes like Model Production Centre, Building materials unit, Training-cum-production centre, District Service Centre and Smoke-free oven, which had to be given up by experience after finding out their non suitability for general implementation in different parts of the country.

**Schemes Dis-continued.**

(1) MODEL PRODUCTION CENTRES:-They did not serve as model for other production centres. For a production centre to be worked as a model, the same pattern of assistance must be applied and the successful working of the scheme for the expected targets, should be demonstrated by an efficient agency in a suitable place or in different parts of the country. The old scheme had all the capital expenditure provided as full grant, and the provision was insufficient for a viable size of activity.

(2) BUILDING MATERIALS UNIT scheme had to be dropped because, in order to work it in a viable size, specialisation in one of the pottery building materials was essential. Tiles activity had to be run as an entirely tiles production unit, may be with some connected items of production as a supplementary activity. In the same way, brick-making required a separate unit, and pipes-making also required a separate unit, though it can be taken up to some extent along with the roofing tiles unit. Flooring tiles also required speciai attention. Each of these requires separate clay bodies. drying facilities and firing facilities. Therefore the scheme for building materials had to be split up.

(3) The scheme for TRAINING-CUM-PRODUCTION CENTRE was drawn with the specific objective, of first training the artisans along certain Improved pottery practices, gradually decreasing the stipend, and not only replacing the stipend but supplementing the income of the trainee, even during the training period, as he approaches the last few months, by wages earned by him in the learning process. Thus, at the end of the training in two courses, in the same colony of potters, a cooperative society was expected to have been nurtured, ready for taking over the viable production activity, with all the essential items of shed, equipments, kiln, working capital etc. Though this plan was very thoughtfully provided in the scheme, it did not work under the assisted agencies due to organisational and administrative weakness. The scheme had a number of inherent salient features. It was not given a fair trial by an efficient agency. It could not be done departmentally, due to the very nature of the scheme.

(4) THE DISTRICT SERVICE-CENTRE scheme had a lot of expectations from the concerned implementing agency. The attitude for development of the industry and the service readiness from the agency to all the potters in the district was the key-note of the scheme. This could not be fulfilled, because the district was found to be too big an area for this purpose. Therefore, it was decided in a technical seminar in 1971 to have blockwise service centres, instead of districtwise service-centres, so that, it will be for a smaller and more compact area for less number of potters for active service. In any service-centre there will be more expenditure than income for a number of years to come. This is one such scheme that will require more grant than loan. The service centre, itself was to run some production centres successfully, in order to serve effectively those who are engaged in this production activity. The revision of this scheme has yet to be achieved.

(5) THE SMOKE-FREE OVEN scheme was got approved due to the enthusiasm exhibited in one or two states. The scheme was expected to be of great service to the lower-middle-class, who can afford to go in for this amenity in their kitchen and who badly require help from those who know the technique of installing the oven, maintaining the same, and supplying the pottery parts for the same, like pipes etc. It was also expected to open up a diversified line of activity, for one or two potters in each locality who can specialise, in readymade Pottery Magan Choola (a smoke-free oven) and earthen pipes of different sizes for the chimney. The smoke-free oven squad in the scheme was provided with full grant for the salary of one leader (a trained enthusiast) and a potter helper. For various reasons the scheme was not popular, except in one agency in Gujarat and another in Tamilnadu i.e. Kallupatti. Therefore, it did not retain the all India character.

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Using of blocks instead of bricks for construction of kiln and chimney can minimise the construction cost and period of construction.

If the bricks are underfired, the same can be used to construct partition walls inside the house or can be refired. If they are overfired, they can be used for metalling the roads or for the foundation of the houses.

Coal will burn with primary and secondary air Firewood will burn with secondary air only and if primary air is applied there will be wastage of fuel. Oil requires preheating and spraying into the kiln.

## CURRENT SCHEMES

### 1 Individual Potter unit.

This scheme is intended for potters who could not get organised under a cooperative society or registered institution for organised production activities. Potters in India have been self-employed to a great extent and many would like to continue to be self-employed but unfortunately the demand for pots and pans has already suffered to some extent with the arrival of aluminium and plastic wares in the market. It is true that even now more than 60% of the country's demand for domestic utensils is met by village potters. It may be due to the poor purchasing capacity of rural population but it is also due to the inherent intrinsic values in pottery, like keeping food free from container-contamination, transmit heat to the contents in a steady manner unlike metal vessels, cooling water and providing cool chamber for keeping vegetables, flowers etc. fresh for a longer time. The purchasing power of the poor and the lower middle class should go up. That will take time. Potters will still be necessary and they have scope in continuing their profession in pots and pans but the quality must improve. It is high time th. individual self-employed potter prepares pottery of a better quality, to fetch him better wages with less effort and more skill. There are various other reasons why individual potters are to be assisted with the know-how and also with improved tools and techniques as well as financial assistance to engage themselves in better quality pottery production.

The demand for improved pottery articles appears to be on the increase, though it requires stocking and selling in a more decent way, involving some time lag between production and sale. Public taste in design and quality of wares is fast changing and it is essential to connect the demand

Fig. No. 19

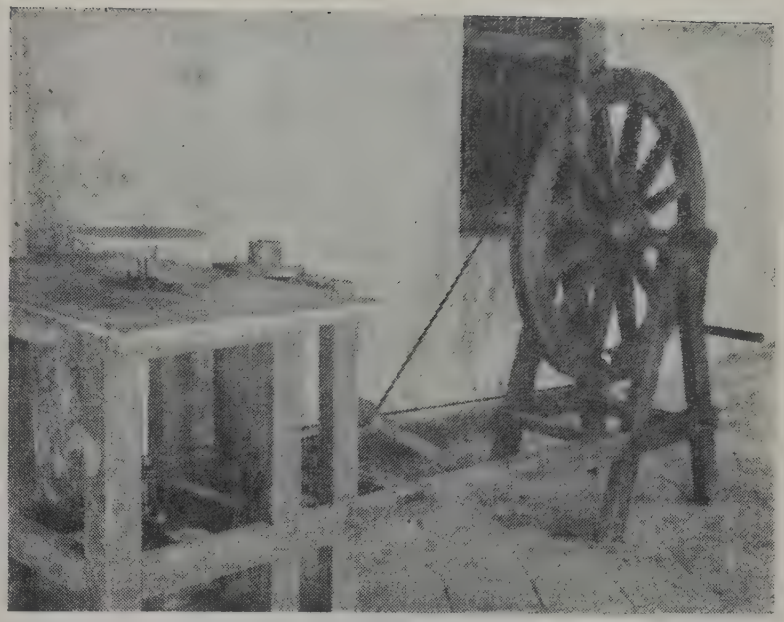

Fig. No. 20

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Fig. No. 21

(Fig. No. 19) **A chain driven wheel** *rotated by a helper. There is the free wheel and fly wheel arrangement.*

(Fig. No. 20) *The* **rope-driven wheel** *rotated by a helper.*

(Fig. No. 21) *Flat* **country roofing** *tiles making.*

*Fig. No. 22*

*The hand-operated* **geared potters wheel** *is in use in stoneware jar factories in East Coast,*

*The* **beltdriven wheel** *rotated by shafting and belting from common motor, as is prevolant in factories.*

*Fig. No. 23*

with the supply, providing the potter the needed help and guidance. The basic objective of this scheme is to enable the potters to have fuller work and higher earnings by supplying improved tools and equipments, improved kilns with shed, clay-washing tank, designs, and the know-how to upgrade their skills

At present the assistance available is Rs. 650/- grant and Rs. 650/- loan per individual potter unit (consisting of husband, wife and a grown-up child). It also provides a working capital loan up to Rs 1,000/-. Each potter may decide what items of assistance he would like to avail of from the list given below :-

(1) Hand-driven ball-bearing wheel, 2) Bhatti with shed, (3) moulds for pipes, special tiles etc. (4) clay-washing tank, (5) turning tools.

The cost of these varies from year to year. He may not need all the above items and he may not need the full working capital provided, up to Rs. 1,000/-. With the assistance, production of pottery worth Rs. 500/- per month is expected for 8 months in the year (leaving 2 months production at half speed and the 2 rainy months with very little work In pottery).

Individual potters can also seek assistance for "Shaila" electric potters wheel. At present the price of the wheel is Rs. 1,800/-, of which 50% is available as grant and 50% as loan. If the loan portion is met on the spot by the individual potter in cash payment, he will get the wheel for Rs. 900/-, deducting the subsidy portion of the cost, but he has to place his order with the concerned State Khadi and Village Industries Board, who should place an order for the equipment with the Pottery Directorate along with cent percent cost of the equipment as advance. The indemnity bond, subsidy receipt, invoice copy of the equipment supplied, and the acknowledgement of the safe receipt of the equipment are the four papers required for supply of equipments at subsidised rates. These papers are required for records for utilisation purposes. The assistance for "Shaila" electric potters wheel is over and above the assistance available for potter u ts and it will be available to those potters who have electric light connection in their homes (220 volts A.C.)

The individual potter is expected to bear in mind that (i) he should not keep the newly acquired tools or construction idle, as he should choose them thoughtfully at the very outset. (ii) He should be able to double his production in value so that his net income can be raised at least by 25%. For this purpose quick turnover and work almost through out the year is necessary (iii) The products have to be well finished, safely dried, light and well-baked. (iv, he should keep some record of what he could produce, sell and earn (Sales minus production expenses) from his production every month. Once in three months the above figures for 3 months, unsold stock of articles, as well as any problems he faces, will be sent by him to the District Officer of the State Board who will take care of the interest of such potters with the help of his field staff.

The identification of potters for receiving assistance either from the Board, the Commission or the Bank should be done by the field staff. The period of repayment of the loan is 3 to 5 years.

Bhatti with shed at present costs Rs. 1,000/- and the assistance is half grant and half loan. Bhatti is expected

to be, although up-draft, an improvement over the traditional clamp. The shed over the bhatti is expected to be constructed on brick pillars, having roof of tiles or tin sheets or cement sheets. It should not be a thatched roof.

Mould set now costs Rs. 400/- and the assistance is half grant and half loan.

**2 Pug-mill.**

There are potters cooperative societies and registered institutions who have taken up development of this industry in an organised manner. The potters working under these agencies will be greatly benefitted by a sturdy supply, at reasonable cost, of dependable prepared clay-body for engaging themselves in utilising their skill and energy for shaping, finishing and firing potterywares without having to waste their time in winning the clays and processing the same to make it workable. Just like any other artisan a potter should be able to get the basic raw material.

In order to supply ready-made clay-body, pug mills of 3 sizes are offered as assistance to the above agencies (a) small size pug-mill with a capacity of 1,000 slabs of 3 kilograms each, (b) medium size pugmill with a capacity of 2,000 slabs of 3 kilograms each (c) large size pug mill with a capacity of 4,000 slabs of 3 kilograms each. Assistance for this machinery is available as full loan. The cost will be revised, year after year.

**3 Land for clay.**

For purchase and / or lease of land having clay deposits, there is a scheme of assistance in the form of capital loan.

a. **For individuals :** This assistance for individuals taking up the programme for the development of Village Pottery Industry on **individual basis** is in the form of loan subject to a maximum of Rs. 500/- in each case.

b. **For institutions :** For institutions taking up the programme for the development of Village Pottery Industry on **institutional basis,** the pattern of assistance is in the form of loan only subject to a maximum of Rs. 5,000/-.

**4 Small common workshed unit.**

This scheme is intended for two trained potters (2 potters families) for engaging themselves in improved pottery production to start the production-culture of improved pottery practices in a potters colony. A workshed with 600 Sq. ft. is provided in addition to the other items of assistance available for individual potters. The provision for the workshed is being revised as per the present-day cost of construction for Katcha structures (loan portion repayable in 5 years.)

**5 Common workshed unit.**

This scheme is for providing common work-shed and other facilities for 10 potters' families. The shed will be having 3,000 sq. ft. built area, water arrangement, open space for drying and godown space for stocking the wares. The provision for this unit is being revised, as the old provision is not adequate for implementing the scheme. In the revised pattern, there will be provision for improved equipments including the medium size pugmill and a down-draught kiln.

**6 Earthen-Pipes Unit.**

Well-fired pipes although made of common clay and unglazed, are durable if burried under-ground, for minor

Fig. No. 24

Fig. No. 25

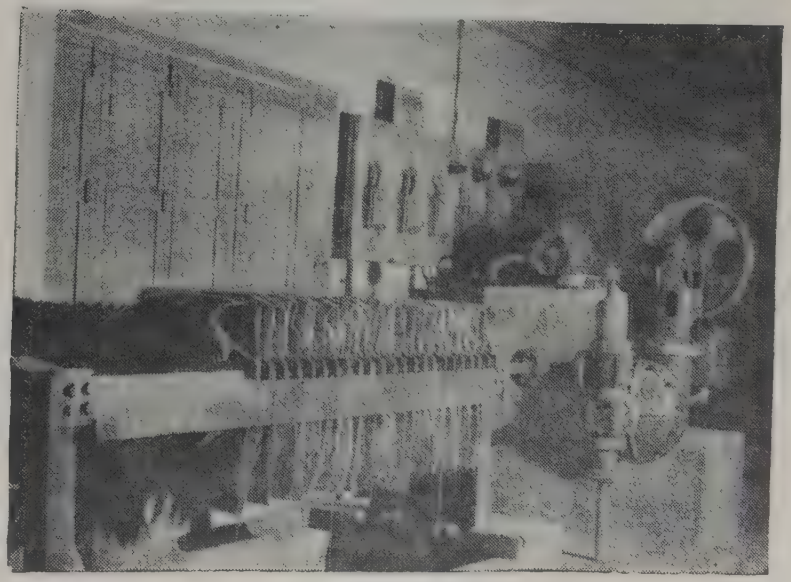

Fig. No. 26

(Fig. No. 24) *This is an* **edge-runner** *which crushes stones like felspar, quartz etc. into powder generally used in white ware pottery.*

(Fig. No. 25) **Ball-mill** *used in pottery production centres in slip house. They are lined with porcelain or granite bricks. These are used for grinding for fine ceramic slip.*

(Fig. No. 26) *The* **filter press** *with diaphragm pump to convert body in slip condition into stiff-clay condition by filtering out the water under pressure.*

Fig. No. 27

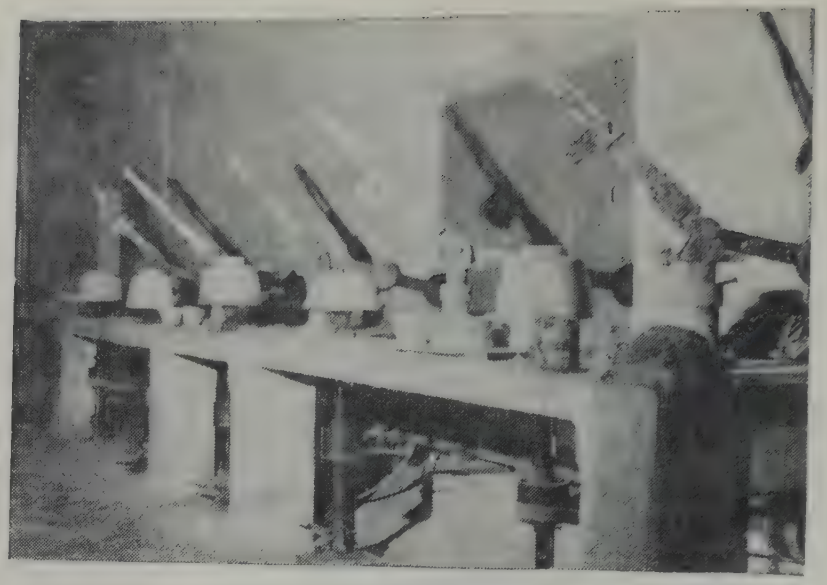

Fig. No. 28

Fig. No. 29

(Fig. No. 27) **Blue pottery of Khurja** *in stone ware pottery with Moghal designs are nice.*

(Fig. No. 28) *A row of* **jiggar and jolly** *to shape cups saucers, etc. at high speed in plaster of Paris moulds.*

(Fig No 29) **Casting** *in Plaster of Paris moulds is the usual practice in the formation of regular and irregular pottery wares. It gives uniform thickness.*

irrigation purposes or for draining away injurious salts from fields. These pipes are comparatively much less costly and more durable than pipes of other materials. Pottery pieces found in the relics of Mohanjo-Daro and Harappa are found intact even after 5,000 years. They are also terra cotta, technically inferior to these unglazed earthen pipes that are fired in a down-draught kiln. The demand for these pipes in various sizes has been steadily growing, throughout the country Therefore, a pilot scheme for pipe-making was launched upon in two selected places. Now regular production units are available in the approved pattern of assistance in two sizes. Both the sizes will use a small pug-mill. The big-size unit will have two down-draught kilns whereas the small-size will have only one up-draught kiln The big or small size unit will be selected according to the demand for pipes in a particular locality. The details are given below.

| **Non-recurring expenditure** | **'A' type unit** | | |
|---|---|---|---|
| | Rs. | | |
| 1. Land and building | | | |
| a. land ½ acre with fencing and gate for the compound and water arrangement | 5,000 | | |
| b. Shed including bhatti shed 2,500 sq. ft. | 12,000 | Rs. | 17,000 |
| 2. Machinery and equipments | | | |
| a. pugmill small with 5 HP motor | 5,000 | | |
| b. Pipe-moulds with stand-block and finishing tools | 500 | | |
| c. Improved potters' wheels and small tools including the hand cart, beam balance etc. | 1,500 | | |
| d. Electricity connection installation, freight etc. | 1,000 | | |
| e. Racks for drying pipe | 1,000 | | |
| f. Two kilns with chimney, capacity 200 Nos. of pipes and 1000 No. of pots. | 6,000 | | |
| g. Furniture | 500 | Rs. | 15,500 |

**'B' type unit**

1. a. Suitable land with water arrangement has to be provided by the agency implementing the programme.

| | Rs. | Rs. |
|---|---|---|
| b. Shed 950 sq. ft. @ Rs. 5/- per sq. ft. | 4,750 | 4,750 |
| 2. Machinary and equipment | | |
| a. Pugmill (small) with 5 HP motor | 5,000 | |
| b. Improved potters wheel and wooden moulds for pipes | 650 | |
| c. Racks for drying | 500 | |
| d. Updraft kiln | 600 | |
| e. Furniture | 250 | 7,000 |

The investment, employment and production in the big and small units are given below.

| **Investment** | **Big** | **Small** |
|---|---|---|
| Capital Expenditure | 32,500 | 11,750 |
| Operational Grant (1 year) | 3,000 | 3,000 |
| Employment | 16 | 7 |
| **Production** | | |
| Quantity | 33,300 | 14,850 |
| Value | 43,650 | 17,550 |

**6 Raniganj-tile unit.**

Raniganj-type roofing tiles are still popular in West Bengal, Orissa, Bihar and Assam. These are also interlocking tiles like Mangalore tiles. The difference between Raniganj-type and Mangalore-type tiles is in the clay used and certain variation in the design of the tiles. Mangalore-type tiles are pressed with more plastic clay in iron dies with a swivel bar in the press, Raniganj-type tiles are pressed in wooden moulds, using less plastic clays. In Mangalore-type tiles the slabs are prepared in pugmill. In Raniganj-type tiles the slabs are made by hand. Raniganj-type tiles weigh about 25% more than Mangalore-type tiles.

Inspite of the above shortcomings in Raniganj-type tiles because these can be made with less investment and with less plastic clays, these tiles are even now popular in the North Eastern states. The provision for this scheme has been found to be out-dated and it is under revision. The scheme is for pressing 500 tiles per day engaging 20 persons of which 4 will be skilled workers, 4 semi-skilled, 9 un-skilled and a Manager, an assistant and a watch-man.

## 7 Mangalore tile unit.

Mangalore type tiles are the most popular roofing tiles not only in India but abroad. This has got various outstanding features over all other roofing tiles. This scheme includes the semi continuous kiln, with six chambers and a chimney of more than 25 meters (75 feet) height. The scheme envisages pressing of 2,500 tiles per day to start with, which will increase in due course as the unit earns profit and is able to put up adequate drying facility and more chambers to fire all the pressed tiles. To start with the production will be about 5 lakhs tiles per year, full time employment for 35, part time employment for 35, with an investment of Rs. 2 lakhs (as per the costs in 1974). Investment and other financial implications in the scheme will vary from place to place and from time to time. What is given in this scheme is only an indication of what could be expected in 1974 for the installed capacity.

### The Scheme

(a) Financial implications :

| | | | |
|---|---|---|---|
| 1) | Land | At least 1 acre of land is expected to be available with the agency undertaking the scheme in a suitable locality. | |
| 2) | Building | Rs. | 54,000 |
| 3) | Water arrangement | Rs. | 5,000 |
| 4) | Machinery and equipment | Rs. | 66,000 |
| 5) | Kiln and chimney | Rs. | 75,000 |
| | Total : | Rs. | 2,00,000 |

(b) Production programme :

5 lakhs tiles per year employing full time 35 persons and part time 35 persons from the third year after establishment.

(c) Financial assistance :

Rs. 2 lakhs loan towards capital expenditure and up to 45% of annual production target towards working capital.

Recurring expenditure per year:- Operational grant Rs. 5000/- for the first three years.

Cost of production of 1st quality Rs. 300/-per thousand

Selling price Rs. 400/- per thousand tiles.

Capital expenditure loan repayable in 10 equal yearly instalments from the 3rd year onwards.

**A. LAND & BUILDING ( Built space ).**

| Item | | Rs. |
|---|---|---|
| 1) Land | 1 acre in a suitable locality | No assistance |
| 2) Building | 4,000 sq. ft. @ 13.50 per sq. ft. | 54,000 |
| 3) Water arrangement | | 5,000 |
| | | 59,000 |

**B. MACHINERY & EQUIPMENT**

| a. Machinery | Price Rs. |
|---|---|
| I. Kiln & Chimney ( with shed over kiln ) | 75,000 |
| II. Tile press ( screw type ) with dies and extra set of dies for Ridge and flooring tiles. | 7,500 |
| III. Pugmill ( double Roller with 25 H. P. Motor and accessories ) | 25,000 |
| IV. Disintegrator / Blunger with cutting table | 5,000 |
| V. Drying, furniture ( 17,500 pallets and the required racks to hold 7 days production of tiles @ 2,500 per day ) | 25,000 |
| VI. Installation charges | 3,500 |
| | 1,41,000 |

Total Blockcapital :
(A + B) = Rs. 59,000 + Rs. 1,41,000 = Rs. 2,00,000.
( Depreciation @ 5% per year assuming the life of building as 20 years, and 10% for machinery )

*Fig. No. 30*

*Fig. No. 31*

*Fig. No. 32*

(*Fig. No. 30&31*) *Polishing the surface of the* **flooring tile** *after pressing and partly drying is the secret of the high quality of these in Chittisseri (Kerala).*

(*Fig. No. 32*) **Relief work** *on terracotta pottery boxes is a great attraction in Dacca University.*

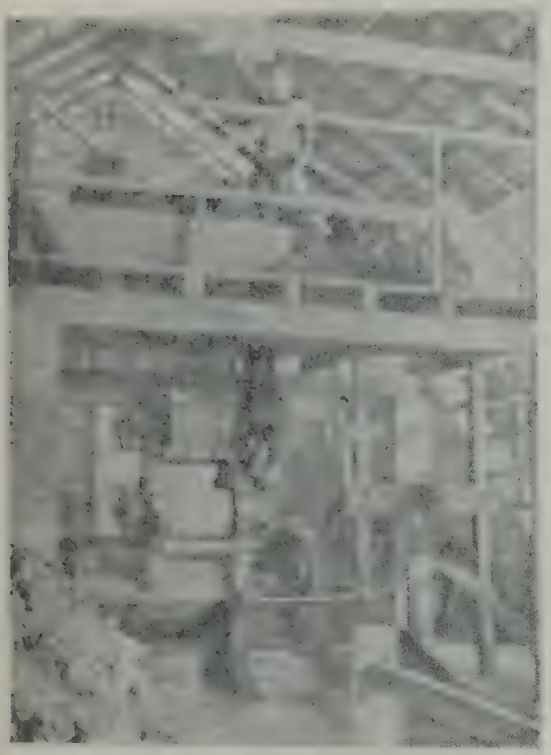

Fig. No. 33

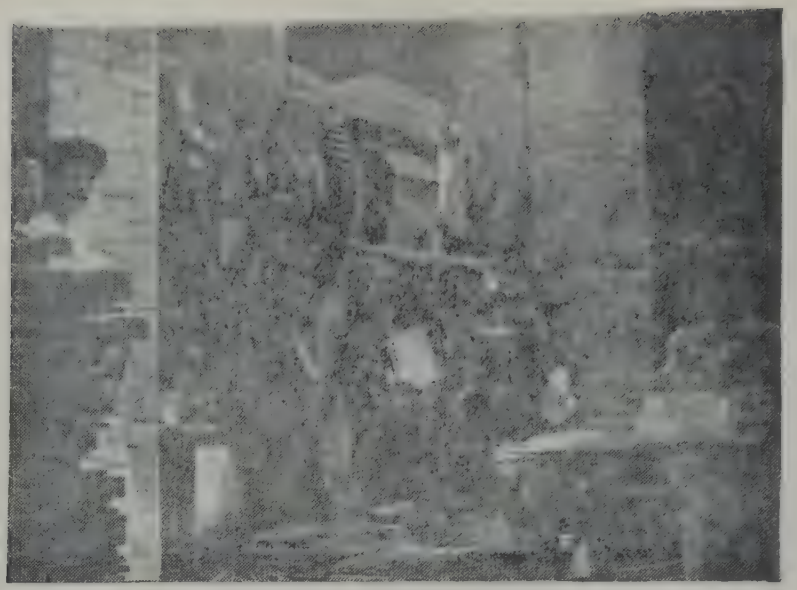

Fig No. 34

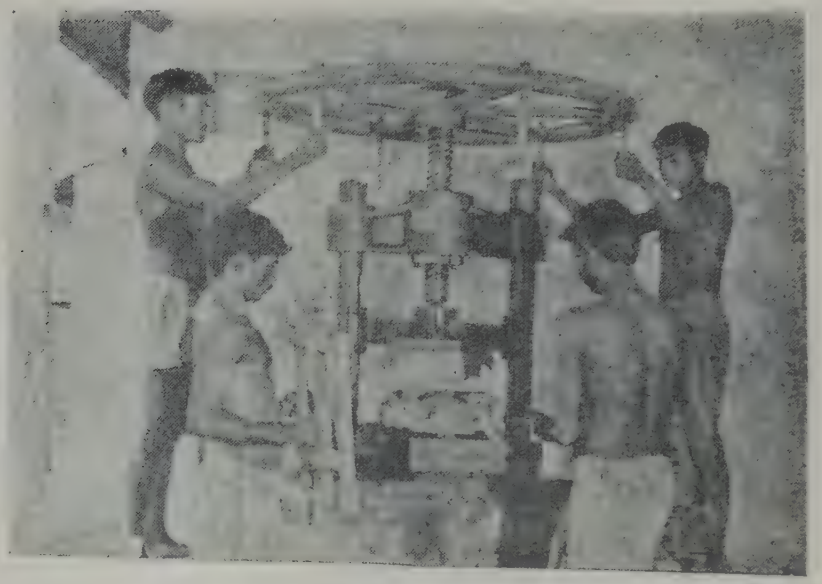

Fig No. 35

(Fig. No. 33) **Pugmill** with a double set of geared rollers and wooden platform above for feeding clay is the acknowledged practice in Mangalore tile factories in Kerala.

(Fig. No. 34) Women are employed in **tile factories** in Kerala. Here they are seen taking the tiles to the drying racks on the pallets.

(Fig. No. 35) 2400 **Mangalore tiles** are pressed in 8 hours in a hand operated press in a rythemic method of work.

## PRODUCTION EXPENDITURE FOR A YEAR

### A. RAW MATERIALS.

| | Rs. |
|---|---|
| I. Clay @ Rs. 6 per ton 3 1/2 tons Per thousand tlies | 13,356 |
| II. Cost of Lubricants @ Rs. 4/- per thousand tiles | 2,544 |
| III. Fuel ( wood) @ Rs. 45 Per ton ( one ton for 1,000 tiles ) | 28,620 |
| Tatal | 44,520 |

### B. WAGES

| | Number of workers | Rate per day Rs. Ps. | Days of work | Annual income of a worker Rs. | Total annual wages Rs. |
|---|---|---|---|---|---|
| **a. Category-I (full time)** | | | | | |
| III Year | 25 | 4.50 | 300 | 1,350 | 33,750 |
| **b. Category-II (Part time)** | | | | | |
| III Year | 15 | 3.50 | 300 | 1,050 | 13,750 |

Total ( a + b ) Rs. 49,500

### C. OTHER SUPERVISORY AND TECHNICAL STAFF

| | |
|---|---|
| I. Forman-cum-Manager @ Rs. 400 p.m. | Rs. 4.800 |
| II. Fireman-cum-Supr. @ Rs. 250 p.m. | Rs. 3,000 |
| Iii. Watchman-cum-Peon @ Rs. 150 p.m. | Rs. 1,800 |

### D. OFFICE CONTINGENCIES — Rs. 12,162

### E. OTHER EXPENSES — Rs. 23,058

Bonus @ 10% of wages and Salaries

Reserve fund @ 5% of Investment from 3rd year onwards

Interest @ 4% on Block Capital of Rs. 2,00,000

Interest on working capital @ 4%

## EXPENDITURE

| ITEM | Rs. |
|---|---|
| I. Raw materials | 44,520 |
| II. Wages to direct labour : | |
| Full Time | 33,750 |
| Part Time | 15,750 |
| **Prime Manufacturing cost** | 94,020 |
| **OVERHEAD EXPENSES** | |
| I. Supervisory & Tech. Staff | 9,600 |
| II. Depreciation : | |
| a On Building | 2,950 |
| b, On Machinery | 14,100 |
| III. Other charges | 23,058 |
| IV. Office contingencies | 12,162 |
| | 61,870 |
| Total Expenditure ( Ex-Factory cost ) | 1,55,890 |
| Sales Price ( as per details given below) | 1,86,030 |
| Net Profit / Loss | 30,140 (profit) |

Investment Output ratio : 1 : 0.93

Investment Employment ratio . Rs. 4,650 : 1

**NOTE :** The Unit will be able to run with full capacity by the end of the 3rd year of establishment.

### SALEABLE TILES UNDER MANGALORE TILES UNITS

| | |
|---|---|
| I Class 60% | Quantity : 3,81,600 tiles @ Rs. 350 per 1,000 tiles Value : Rs. 1,33,560 |
| Ii Class 25% | Quantity : 1,50,000 tiles @ Rs. 250 per 1,000 tiles Value : Rs. 39,750 |
| III Class 5% | Quantity : 63,600 tiles @ Rs. 200 per 1.000 tiles Value : Rs. 12,720 |
| IV Class [ rejection ] | |
| | Rs. 1,86,030 |

## BRICK BHATTA

There are schemes for two sizes of brick bhatta, small and big. Brick **bhatta** is different from brick **bhatti**. The bhatta is a continuous kiln of a number of improvised chambers, having one or more chimneys, either stable or moveable. The bhattis are what are otherwise called clamps that are stacked on ground level and fired by the up-draught method in open air without any chimney. Brick making in the northern states is generally done by the bhatta method. The advantage of burning bricks in the bhatta are well known to the people in the Indo Gangetic planes. Systematic working of the bhatta generally yields sizeable profit, wherever there is a steady demand for the bricks and where good clay is available just for the digging, almost at the site of bhatta. A bhatta serves the demand for five miles radius in Uttar Pradesh and it works for five years at the same place, by which time the available clay near the bhatta site would have been exhausted. Hence the unit is generally shifted every five years.

The Bhatta is of an oval trench, generally about 20 to 30 feet wide and 7 feet in depth (cross section of the trench). The bhatta is built. 3 feet under ground and 4 feet above ground. The chinney of about 30 to 40 feet height, having an oblong bottom of 8' and cylindrical top of 2½' diameter, is built of iron of ¼" thick at the bottom and 18 guage at the top. Bricks are loaded in the trench, chamber by chamber, and feeding of fuel is done through the holes at the top of the chamber. As soon as the bricks in one chamber are baked, the next chamber is ready, preheated from the waste gases from the previous chamber and the chimneys are moved to two chambers in advance. Fresh air drawn through the cooling chambers, already fired enter into the firing chamber. The pre-heated air supply to and the utilisation of the waste gases from the chamber which is being fired is responsible for the saving in fuel. Firing is achieved more uniformly in the bhattas, as compared in brick bhatti (clamp system). Thus the fire travels along the trench from chamber to chamber, leaving behind the fired chambers to cool and heating 2 chambers ahead. Loading of bricks, firing, cooling, and unloading goes on systematically keeping the tempo of brick production continuously, day and night, for the whole season of about 6 months. In one complete round, nearly 5 lakhs bricks are fired in small size bhatta and 7 lakhs bricks in the big size bhatta. In one season 5 to 6 rounds are possible, having a production of about 25 lakhs bricks in the small size bhatta and 40 lakhs bricks in the big size bhatta.

### Financial Assistance Available

| Capital expenditure : | Small size Rs. | Big size Rs. |
|---|---|---|
| a) Land for the bhatta (1 acre for small, 1½ for big) | 12,000 | 18,000 |
| b) Digging & construction of bhatta | 4,000 | 6,000 |
| c) Water arrangements | 2,000 | 2,000 |
| d) Shed for disintegrator etc. | 2,000 | 2,000 |
| e) 2 Chimneys & accessories | 5,000 | 6,000 |
| f) Disintegrator with 10 H. P. oil engine for Surkhi fron broken bricks | 5,000 | 5,000 |
| | 30,000 | 39,000 |

### Working capital :

The working capital provision is upto 45% of the estimated annual value of disposal, including some provision for

Fig. No. 36

Fig. No. 37

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore 560 034
India

(Fig. No. 36&37) *Women are employed liberally in* **tile factories** *in Kerala. Here they are seen taking the tiles to the drying racks on the pallets.*

Fig. No. 38

(Fig. No. 38) *A view of one of the* **glazed pottery** *units at left and one* **Mangalore tile** *unit at right, with a common chimney at Nagla Akhoo (Uttar Pradesh)*

*Fig. No 39*

*A cross section of the* **brick-bhatta** *showing how the bricks are loaded.*

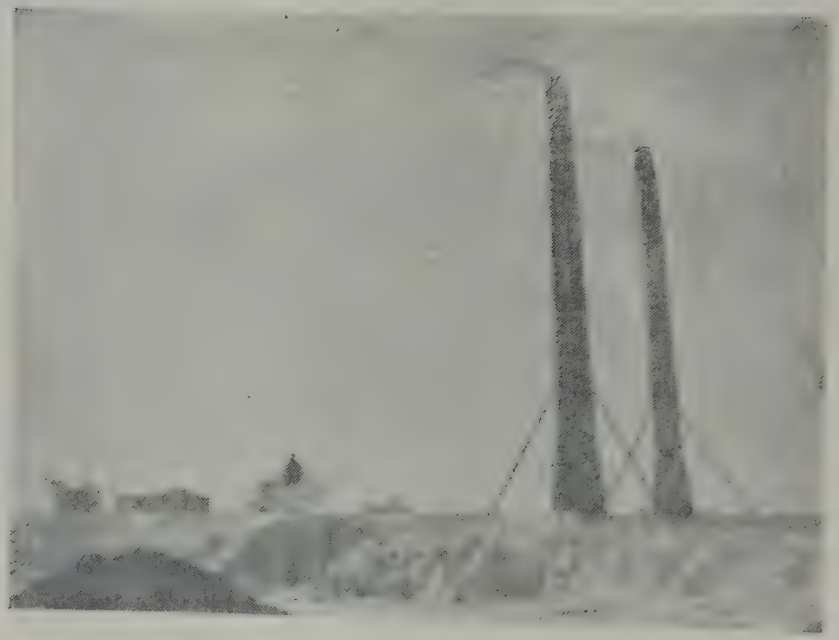

*Fig. No. 40*

*The* **movable chimneys** *used in a brick-bhatta in U. P. etc.*

stocking of coal. An additional provision of Rs. 20,000/- for the small bhatta and Rs. 32,000/- for the big bhatta towards stocking of coal is necessary where coal is to be stocked for the entire season.

Under machinery and equipments the disintegrator with oil engine and workshed for the disintegrator will be necessary only where the bhatta intends to supply surkhi powder from brick bats for masonary purposes by way of lime surkhi mortar.

*Note* : The assistance from the commission for the brick-bhatta scheme is now available only to industrial Cooperatives of artisans. Capital expenditure and working capital loans are charged at 4% interest. Land may be preferably taken on lease basis for 5 years and lease rent may be provided in the form of rent from working capital. Some idea about the employment pattern is given below for working moulds at 3 persons per mould.

| | Small size 20 moulds | Big size 30 moulds |
|---|---|---|
| No. of persons employed | 60 | 90 |
| Firemen to work by turns | 6 | 6 |
| Loading unloading (16/24 persons half time) | 8 | 12 |
| Bheldar to supervise loading (2/4 persons half time) | 1 | 2 |
| Clay carriers (2/4 persons half time) | 1 | 2 |
| Thekadars and assistants | 2 | 3 |
| Munshi and watchmen | 2 | 3 |
| Clay and brick carriers (using donkeys) | 10 | 15 |
| Total : | 90 | 133 |

**Cost structure of 1000 bricks.**

| | | |
|---|---|---|
| For making | Rs. | 20/- |
| For shifting, loading, unloading etc. | Rs. | 20/- |
| Firing charges per 1000 | Rs. | 6/- |
| Fuel charges 1·80 quintals (Slack coal also known as coal dust but not coal ash @ Rs. 200/- per ton.) | Rs. | 36/- |
| Depreciation of equipments, lease rent etc. | Rs. | 10/- |
| Cost price of 1000 bricks | Rs. | 92/- |

This varies from place to place and from time to time according to the labour, fuel charges etc.

The investments, production, employment, wages and profit on the small and big bhatta are given below :

| | Small Unit | Big Unit |
|---|---|---|
| (1) Investment. Capital Expenditure | Rs. 30,000 | Rs. 39,000 |
| (2) Working capital 45% | Rs. 1,00,000 | Rs. 2,50,000 |
| (3) Production | 25 lakhs bricks | 40 lakhs bricks |
| (4) Employment No. of Persons | 90 | 135 persons. |
| (5) Wages | Rs. 33,200 | Rs. 80,400 |
| (6) Profit | Rs. 41,100 | Rs. 1,38,000 |

**Glazed Pottery Unit.**

The approved scheme for this activity is now about two years old. The salient features of that scheme are given below. Whiteware glazed pottery articles like earthenware (cups and saucers etc with upto 10% porosity) and Stoneware (jars, bowls, crockery, low tension insulators, etc. with about 3% porosity) are envisaged in this scheme. In addition to the above, all wares requiring a temperature between 1,150°C and 1,300°C come under the purview of this scheme. Over-glaze decoration at 750°C is also envisaged as a part and parcel of this activity.

This is a self sufficient scheme including a slip-house for production of whiteware of about half a ton per day.

**The scheme.**

**(a) Financial implications.**

| | Cost as per rates in 1972. |
|---|---|
| Land and building | Rs. 49,000/- |
| Machinery and equipments | Rs. 55,000/- |
| Kilns and kiln shed | Rs. 43,500/- |
| Contingencies | Rs. 2,500/- |
| | Rs. 1,50,000/- |

**(b) Production programme.**

168 tons pottery worth Rs. 1·8 lakhs, employing 55 persons from the fourth year onwards after establishing the unit.

**(c) Financial Assistance Available**

| | Grant Rs. | Loan Rs. |
|---|---|---|
| 1. Capital Expenditure | ... | 1,50,000 |
| 2. Working capital | ... | 45% of the annual production target |
| 3. Operational grant per year for the first 3 years | 5,000 | ... |

**(d) Cost of production**

(Average cost price) Rs 1,000/- approximately per ton. Selling price approximately Rs. 1,200/- per ton.

Loan repayable in 10 equal yearly instalments from the third year onwards. The above rates have increased in 1975 to the extent of about 100% which means the capital expenditure investment will be about 3 lakhs rupees and the selling price is also Rs 2 500/- approximately per ton.

Details of the scheme as in 1972 (which is to be doubled in 1975) are given below :

**A. LAND & BUILDING**

| | |
|---|---|
| a) Land one acre (normally expected to be available with the institution taking up this scheme) | Rs. 5,000 |
| b) Building with total plinth area of 4,000 sq. ft (360 sq. meters) at Rs. 10/- per sq. foot. | Rs. 40,000 |
| c) Water arrangement | Rs. 4,000 |
| | Rs. 49,000 |

**B. MACHINERY & EQUIPMENTS**

| | |
|---|---|
| a) Edge Runner of 4' dia, base, 2'6" dia, runner stone, with 5 H. P. motor | Rs. 6,000 |
| b) Ball mill 4½' x 4' with lining ( capacity 500 kgs.) | Rs. 3,500 |
| c) Ball Mill 3' x 3' with lining ( capacity 250 kgs. ) | Rs. 3,000 |
| d) Ball Mill 2'x2' with lining (capacy 50 kgs.) | Rs. 1,500 |
| e) Pot mill with single row of 3 pots ( of 3 kg. capacity each) | Rs. 1,000 |
| f) Common motor of 10 HP and accessories to run the machines under items b, c, d, & e. | Rs. 3,000 |
| g) Blunger 3' dia, x 5' depth with 5 HP motor starter & other accessories (capacity 1 ton) | Rs. 3,000 |
| h) Mixing arc 3' dia, x 5' depth with 3 HP motor, starter etc. | Rs. 2,000 |
| i) Filter press with 24 chambers of chamber dia 18" and diaphragm pump of 2½' suction 2" delivery and 6" stroke, with 5 HP motor | Rs. 8,000 |
| j) Pug mill capacity 2 tones (common motor for i and j ) | Rs. 3,000 |
| | Rs. 34,000 |

*Fig. No. 41*

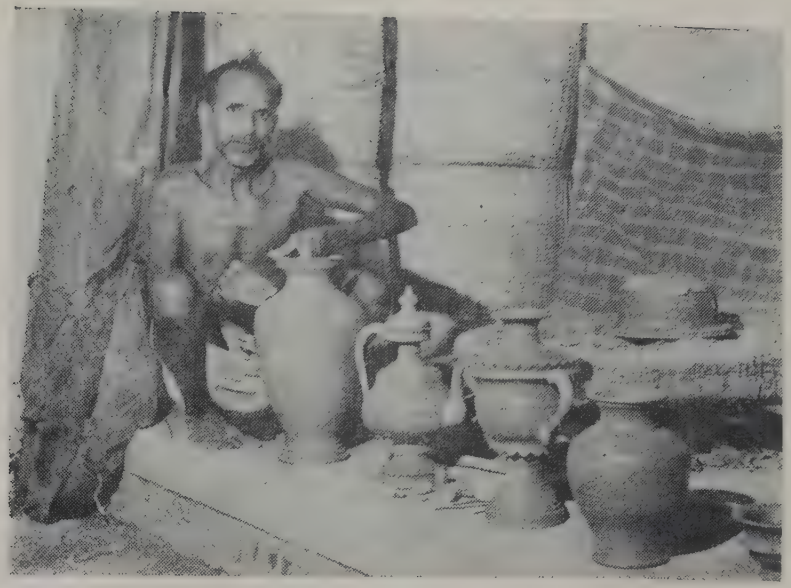

*Fig. No. 42*

*Fig. No. 43*

(*Fig. No. 41*) *Here is a pottery-table-lamp. The cut-design in the shade has great possibilities.*

(*Fig. No. 42*) *The* **Karigiri potters**, *(Tamilnadu) have attractive shapes of Nawabi style.*

(*Fig. No. 43*) *The simple but highly artistic and telented* **glazed pottery of Karigiri** *near Katpadi (Tamilnadu) is fired in almost an improvised muffle, thus.*

Fig. No. 44

Fig. No. 46

Fig. No. 45

(Fig. No. 44 & 46) *Engraving of designs on wares before firing is resorted to in Nazamabad–type* **black shining pottery** *wares.*

(Fig. No. 45) *The firing of* **black shining pottery** *ware popular in Nizambad (U. P.) is achieved in a big pot using dung–cakes for fuel.*

| | | |
|---|---|---|
| k) | 3 power driven wheels and jigger and jolly with necessary gear arrangements and 3 HP. motor | Rs. 3,000 |
| l) | Spray gun with 1 HP motor, Magnetic separator and other small tools | Rs. 2,500 |
| m) | Screw cutting machine, with die for lid | Rs. 1,000 |
| n) | Sagger accessories including a sagger press with dies | Rs. 3,000 |
| o) | Freight & installation charges and expenditure on light and power connections | Rs. 6,000 |
| p) | Drying furniture–racks, planks etc. | Rs. 3,500 |
| q) | Office furniture | Rs. 2,000 |
| | | Rs. 55,000 |
| r) | 12' dia downdraft kilns, (2) (or one 18' dia) with a common chimney of 50' height. | Rs. 28,500 |
| s) | Experimental kilns | Rs 4,000 |
| t) | Shed over the kilns | Rs. 11,000 |
| | | Rs. 43,500 |
| u) | Lumpsum provision to meet unforeseen expenses | Rs. 2,500 |
| | TOTAL | Rs. 1,50,000 |

## C. PRODUCTION PROGRAMME

| | Year I | II | III | IV |
|---|---|---|---|---|
| Production of stone ware jars (1·75 tons per charge) in tons | 10·5 | 84 | 136·5 | 168 |
| Wage earners | 6 | 20 | 33 | 50 |
| Staff members | 4 | 4 | 5 | 5 |
| Estimated loss (—) or profit (+) Rs. | (—)2,020 | (+) 13,240 | (+) 32,627 | (+) 35,378 |

## D. ESTIMATED PROFIT AND LOSS ACCOUNT

| | Rs. | (IVth year onwards) | Rs. |
|---|---|---|---|
| Cost of production | 1,31,650 | Sales proceeds (60% I class @ Rs. 1300 per ton 20% II class @ Rs. 1200 per ton 10% III class @ Rs 1100 per ton 10% rejects) | 1,89,840 |
| Gross Profit | 58,190 | | |
| | 1,89,840 | | 1,89,840 |
| Over head charges | 12,420 | Gross Profit | 58,190 |
| Depreciation | 10,392 | | |
| Net Profit | 35,378 | | |
| | 58,190 | | 58,190 |

| | |
|---|---|
| Heat balance of building bricks burnt at 2000°F | |
| Heat lost by flue gases | 27·33% |
| Heat lost by ashes | 3·51% |
| Heat lost by radiation of cooling | 49·61% |
| Heat used by the bricks | 19·55% |

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16. If more number of hollow articles are loaded in the kiln, it consumes more fuel because heat takes more time to radiate in the hollow space.

## Other Schemes

Other than regular production units there are the following schemes for assistance for development of this industry in different parts of the country.

(A) Demonstration squads are working with grant from the Commission, one or two in each state for introduction of improved implements and techniques.

(B) Regional Training centres are run for artisans (Master Potters) at the following places :

Saramohanpur, Dist. Darbhanga ( Bihar ) for improved pots and pans.

Bhadrawati, Dist. Chanda (Maharashtra) for whiteware Glazed pottery.

Sevapet, P. O. Tirur, Dist. Chinglepet, (Tamilnadu) for improved pots and pans.

Chittisseri, Pudukkad, Dist. Trichur (Kerala) for Mangalore-type tiles.

There are two training courses per year of 5 months each one starting on the 1st January and the other on the 1st of July for improved pots and pans and only one course of training per year for whiteware pottery and Mangalore tiles of 10 months duration, the course starting from the 1st of January.

(C) Central Village Pottery Institute, Khanapur, (Dist. Belgaum (Karnataka) trains organisers and supervisors. These courses start from the 1st January of every year, 11 months for organisers and 9 months for supervisors.

(D) Marketing grant for five years on pottery except bricks and tiles as indicated below is available

| | Year | | | | |
|---|---|---|---|---|---|
| | I | II | III | IV | V |
| Percentage on total Sales; (when sales exceeds Rs. 5,000 only and with a ceiling of Rs. 2,000 per year for a selling agency) | 9% | 8% | 7% | 6% | 5% |

(E) Capital formation loan for Registered Institutions registered under the Societies Registration Act, 1960 or such other Acts enacted by the State Governments: Loan shall be given upto four times their owned capital with a ceiling of Rs. 1,50,000 provided the total borrowings of the institutions do not exceed ten times their own assets, including capital formation loan.

Share Capital loan for artisans' cooperatives societies. Loan may be sanctioned to the extent of 87½ per cent of the value of shares held by a member irrespective of the number of value of each share upto the ceiling that is prescribed.

(F) Working capital loan upto 45% of the annual pottery production target.

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| **Visible pyrometry inside the kiln,** | |
|---|---|
| Just visible red | 500°C |
| Dark red | 700°C |
| Just cherry red | 800°C |
| Brignt red | 1000°C |
| Bright orange | 1200°C |
| Bright white | 1300°C |
| Dull white | 1400°C |
| Shining white | 1500°C |

*Fig. No. 47*

*Hand operated ball bearing wheel is being examined by throwing a jar in Saranjam Samelan, Rajkot.*

*Specimens of blue pottery, Speciality in Jaipur and Khurja.*

*Fig. No. 48*

*Fig. No. 49*

*The* **"Shaila" electric potters wheel** *is powerful and handy though with 1/8th H. P.*

*Fig. No. 50*

*A view of two chambers of* **Naborigama-type kiln** *(step kiln) being constructed in the Art Section of Dacca University.*

## SCHEMES AND PATTERNS OF ASSISTANCE AT A GLANCE.

| Sr. No. | Schemes | Capital expenditure | | Operational Grant | Working Capital | Annual Production Target | | Employment target | |
|---|---|---|---|---|---|---|---|---|---|
| | | Grant | Loan | | | Quantity | Value Rs. | Full time | Part time |
| 1. | Individual Potter Unit | 650 | 650 | ... | 1,000 | 20 Bhatti Loads | 5,000 | 3 | ... |
| | or a) Ball bearing wheel | 88 | 88 | ... | ... | ... | ... | — | ... |
| | b) Moulds set | 200 | 200 | ... | ... | ... | ... | — | ... |
| | c) Bhatti with shed | 500 | 500 | ... | .. | ... | ... | — | ... |
| 2. | "Shaila" Electric Potters Wheel | 900 | 900 | ... | ... | ... | ... | — | ... |
| 3. | Pug mill A type | — | ✠ | | | | | | |
| | B type | — | ✠ | | | | | | |
| | C type | — | ✠ | | | | | | |
| 4. | Small common workshed unit | ✠ | ✠ | ... | | 40 Bhatti loads | 10,000 | 6 | ... |
| 5. | Common workshed unit | — | ✠ | ✠ | | 200 Bhatti loads | 50,000 | 30 | ... |
| 6. | Earthen pipes unit | | | | | | | | |
| | i) Big | — | 32,500 | 3,000 (One | | 33,300 | 43,650 | 16 | ... |
| | ii) Small | — | 11,750 | 3,000 year) | 45% of the Annual Production target agreed to. | 14,850 | 17,550 | 7 | ... |
| 7. | Raniganj tile unit | ✠ | ✠ | ... | | 1 lakh tiles | 40,000 | 10 | 10 |
| 8. | Brick Bhatta (with chimney) | | | | | | | | |
| | i) Small | — | 30,000 | ... | | 25 lakhs Bricks | 2·5 lakhs | 90 | ... |
| | ii) Big | — | 39,000 | ... | | 40 lakhs Bricks | 4.00 lakhs | 135 | ... |
| 9. | Glazed Pottery Unit | ... | 1,50,000* | 5,000 | | 100 tons | 2.00 lakhs | 38 | ... |
| 10. | Mangalore type tile unit | ... | 2,00,000 | 5,000 | | 5 lakhs tiles | 2.00 lakhs | 35 | ... |

* The Pattern/price is being refixed.

A : Demonstration squads are working with grant from the Commission, (one or two in each state) for introduction of Improved implements and techniques.

B : Regional Training centres are run for artisans at Saramohanpur, Darbhanga (Bihar)
Bhadrawati, Dist. Chanda (Maharashtra)
Sevapet, P. O. Tirur, Dist. Chinglepet near Madras (Tamilnadu)
Chittisseri (Dist. Trichur) Kerala State.

C : Central Village Pottery Institute, Khanapur (Dist. Belgaum) Karnataka, trains Organisers and Supervisors.

D : Marketing grant for five years on pottery except bricks and tiles.

E : Capital formation loan for Registered Institutions and Share capital loan for artisans' co-operatives societies.

F : Loan for purchase or lease of land for clay.

G : Working capital loan @ 45% of the annual pottery production target agreed to.

## PYROMETRIC CONES

Pyrometric cones are the simplest and cheapest device for reading the temperature in kilns. These are made in the shape of pyramids, using materials similar in composition to ceramic wares. These cones are available generally in 2 sizes 2½" and 1" long.

It is a general practice to use three or four cones on each plaque. The first cone should be considered as a Signal cone, the second to indicate the end point of firing when 3 cones are used, and in case of four cones the second is to indicate the heat advance, the third higher cone to indicate end point of firing (when 4 cones are used). In case of three cones the third one or the last cone in the set of 4 cones is a guard or the sentinal cone which must not bend appreciably if over firing is to be avoided.

In general use the following list shows the cones usually employed in the regular types of kilns :

| | | |
|---|---|---|
| 1. | Glass colours | 022 to 010 |
| 2. | Enamel kiln (Soft Fluxes) | 019 to 015 |
| 3. | Enamel kiln (Ordinary) | 014 to 011 |
| 4. | Enamel kiln (Hard) | 012 to 07 |
| 5. | Red Brick Kiln | 010 to 01 |
| 6. | Tile and Majolica kilns | 07 to 01 |
| 7. | Glost Oven (Soft Glazes) | 05 to 1 |
| 8. | Glost Oven (Earthenware and China) | 03 to 5 |
| 9. | Earthenware Biscuit oven | 3 to 8 |
| 10 | Vitreous Tile and Granite Biscuit Oven | 4 to 9 |
| 11. | China Biscuit and sanitary Oven | 7 to 12 |
| 12. | Hard porcelain | 13 to 17 |
| 13 | Special refractory Bricks etc. | 17 or above |

A table showing the seger cone numbers of Ganga Glass Works and the corresponding squatting temperature in Centigrade and Fahrenheit is given. Another table showing the approximate temperature equivalents conforming to Orton Standard cones is also given.

## APPROXIMATE SQUATTING TEMPERATURE OF PYROMETRIC CONES

### (Seger Standard)

| Ganga Pyrometric Cone | Temperature | | Pyrometric cone | Temperature | |
|---|---|---|---|---|---|
| | °C | °F | | °C | °F |
| 022 | 600 | 1112 | 9 | 1280 | 2336 |
| 021 | 650 | 1202 | 10 | 1300 | 2372 |
| 020 | 670 | 1238 | 11 | 1320 | 2408 |
| 019 | 690 | 1274 | 12 | 1350 | 2462 |
| 018 | 710 | 1310 | 13 | 1380 | 2516 |
| 017 | 730 | 1346 | 14 | 1410 | 2570 |
| 016 | 750 | 1382 | 15 | 1435 | 2615 |
| 015 | 790 | 1454 | 16 | 1460 | 2660 |
| 014 | 815 | 1499 | 17 | 1480 | 2696 |
| 013 | 835 | 1535 | 18 | 1500 | 2732 |
| 012 | 855 | 1571 | 19 | 1520 | 2768 |
| 011 | 880 | 1616 | 20 | 1530 | 2786 |
| 010 | 900 | 1652 | 26 | 1580 | 2876 |
| 09 | 920 | 1688 | 27 | 1610 | 2930 |
| 08 | 940 | 1724 | 28 | 1630 | 2966 |
| 07 | 960 | 1760 | 29 | 1650 | 3002 |
| 06 | 980 | 1796 | 30 | 1670 | 3038 |
| 05 | 1000 | 1832 | 31 | 1690 | 3074 |
| 04 | 1020 | 1868 | 32 | 1710 | 3110 |
| 03 | 1040 | 1904 | 33 | 1730 | 3146 |
| 02 | 1060 | 1940 | 34 | 1750 | 3182 |
| 01 | 1080 | 1979 | 35 | 1770 | 3218 |
| 1 | 1100 | 2012 | 36 | 1790 | 3254 |
| 2 | 1120 | 2048 | 37 | 1825 | 3317 |
| 3 | 1140 | 2084 | 38 | 1850 | 3362 |
| 4 | 1160 | 2120 | 39 | 1880 | 3416 |
| 5 | 1180 | 2156 | 40 | 1920 | 3488 |
| 6 | 1200 | 2192 | 41 | 1960 | 3560 |
| 7 | 1230 | 2246 | 42 | 2000 | 3632 |
| 8 | 1250 | 2282 | | | |

*Note* :— Numbers 21 to 25 not given as their fusing points lie too close and their indications are irregular

*Fig. No. 51*

**Earthen pipeline** *laid underground for minor irrigation.*

*Fig. No. 52*

*After firing, the engraved designs are filled with mercury amalgam of fine powder by rubbing in Nizamabad type pottery wares.*

*Fig. No. 53*

*Throwing jar on a self-contained power driven potters wheel.*

*Fig. No. 54*

*Potter throwing on the De-clutching wheel.*

## PYROMETRIC CONES

*(Generally Conforming to Orton Standard Cones)*

## APPROXIMATE TEMPERATURE EQUIVALENTS

| CONE NO. | 150°C | 270°F |
|---|---|---|
| 23 | 1605 | 2921 |
| 26 | 1621 | 2950 |
| 27 | 1640 | 2984 |
| 28 | 1646 | 2994 |
| 29 | 1659 | 3018 |
| 30 | 1665 | 3029 |
| 31 | 1683 | 3061 |
| 31½ | 1699 | 3090 |
| 32 | 1717 | 3123 |
| 32½ | 1724 | 3135 |
| 33 | 1743 | 3169 |
| 34 | 1763 | 3205 |
| 35 | 1785 | 3245 |
| 36 | 1804 | 3279 |
| 37 | 1820 | 3308 |
| 38 | 1835 | 3335 |
| 39 | 1865 | 3389 |
| 40 | 1885 | 3425 |
| 41 | 1970 | 3578 |
| 42 | 2015 | 3659 |

## ELECTRICAL CONNECTIONS

There are two types of supply in electricity;

1) Alternative Current supply is called AC,
2) Direct current supply is called DC.

In Ac supply there are two kinds of terms generally used;

1) Three phase. 2) Single phase.

In Dc there is only one positive and one negative that completes the circuit. DC supply can be obtained from a direct current Generator or from any of the batteries or accumulators.

In three phase supply there will be three leads carrying power at a voltage of 440 volts between them. Whereas in single phase there will be only two wires out of them one which is one of the 3 lines of the original 3 phase system and hence called the 'phase' carries the current to the load and the other wire which is called neutral provides the return path for the current after passing through the load and thus completing the circuit.

**How to fix Volt meter And Ammeter.**

Voltmeter has to be connected between any of the two phases in a three phase supply or from phase to neutral in single phase. Ammeter is connected in series with one of the phases in a three phase supply to the load and from phase to the load in single phase.

**Earthing connection.**

Earthing wire should never be connected to the neutral whether in single phase or three phase at any cost.

Earthing is necessary for any machine that requires electricity to run the same. Generally a local earthing connection is provided by electric contractor. If this is not done, one end of a copper wire may be fixed to the body of the machine with motor and the other end has to be connected to a common tap, (this is not applicable to a pipeline which is taken from a cement overhead tank or the one which has not drawn from the earth) or a pit having a depth of minimum 2 feet. The copper wire which is coming from the machine has to be coiled and placed in the pit through a pipe. Some salt and charcoal has to be put on the wire coil, inside the pit and may be covered by mud. It will be very good to keep that pit place always wet.

**Important :**

Generally there will not be plug points for three phase. The three holed or three pin plugs should never be mistaken to three phase. It is a single phase plug point used only for 220 volts. These three pins or holes are for phase, neutral and earth connections. In this type of plugs two holes will be of small size and one big. The bigger one is for earthing connection and the other two are for phase and neutral.

**CONNECTIONS :**

1) Red colour wire is for phase.
2) Black colour wire is for neutral.
3) Green colour wire is for earthing connection.

Switch (or cutouts) should be used **only on the phase connection (and not on neutral or earthing connection.)**

## PROPERTIES OF THE ELEMENTS

### (Related to Pottery)

| Element | Symbol | Atomic Weight (O=16 | Density g/cm² ) at 20° C. | Melting point °C | Boiling point °C |
|---|---|---|---|---|---|
| Aluminum | Al | 26·98 | 2·70 | 660·1 | 2500 |
| Antimony | Sb | 121·76 | 6·7 | 630·5 | 1440 |
| Argon | A | 39·944 | ·0017 | — 189·3 | — 186 |
| Bariam | Ba | 137·36 | 3·5 | 704 | 1600 |
| Bismuth | Bi | 209 | 9·8 | 271·3 | 1477 |
| Cadmium | Cd | 112·41 | 8·65 | 320·9 | 768 |
| Calcium | Ca | 40·08 | 1·54 | 851 | 1440 |
| Carbon | C | 12·011 | 2·2 | 3700 | 4300 |
| Cobalt | Co | 58·94 | 8·9 | 1492 | 3000 |
| Copper | Cu | 63·54 | 8·96 | 1083 | 2500 |
| Gold | Au | 197 | 19·3 | 1063 | 2950 |
| Heliam | He | 4·003 | ·00017 | — 271·4 | 268·93 |
| Iron | Fe | 55·85 | 7·87 | 1535 | 2900 |
| Lead | Pb | 207·21 | 11·34 | 327·3 | 1750 |
| Lithiom | Li | 0·940 | 0·534 | 186 | 1400 |
| Magnesium | Mg | 24·32 | 1·741 | 650 | 1103 |
| Manganese | Mn | 54·94 | 74·44 | 1245 | 2150 |
| Murcury | Hg | 200·61 | 13·595 | — 38·87 | 356·58 |
| Nickel | Ni | 14·008 | 8·9 | 1453 | 3100 |
| Oxygen | O | 16 | ·00133 | — 218·4 | — 182·97 |
| Platinum | Pt | 195·09 | 21·45 | 1769 | 4500 |
| Potassiam | K | 39·1 | 0·86 | 63·6 | 770 |
| Rhodium | Rh | 102·91 | 12·44 | 1960 | 4500 |
| Selenium | Se | 78·96 | 4·81 | 220 | 688 |
| Silicon | Si | 28·09 | 3·4 | 1420 | 2600 |
| Silver | Ag | 107·880 | 10·5 | 960·8 | 2180 |
| Sodium | Na | 22·991 | 0·97 | 97·7 | 883 |
| Tin | Sn | 118·70 | 7·3 | 231·9 | 2270 |
| Titanium | Ti | 47·90 | 4·54 | 1660 | 3000 |
| Zinc | Zn | 65·38 | 7·14 | 419·5 | 910 |
| Zirconium | Zr | 91·22 | 6·5 | 1857 | 5000 |

## PROPERTIES OF SOLIDS

### (Related to Pottery)

| Substance | Density ( g/cm² ) | Specific Heat | Melting point (6) | Latent Heat of fusion. |
|---|---|---|---|---|
| Aluminum | 2·70 | ·216 | 660·6 | 93 |
| Antimony | 6·68 | ·049 | 630·5 | 38·3 |
| Bismuth | 9·80 | ·030 | 271·3 | 12·5 |
| Brass | 8·8 | ·089 | 1050 | — |
| Brick | 2 | 0·8 | — | — |
| Concrete | 2·2 | 0·8 | — | — |
| Cobalt | 8·9 | ·10 | 1492 | 58·4 |
| Copper | 3·96 | ·092 | 1083 | 50·6 |
| Glass (Flint) | 4·5 | ·12 | 1100 | — |
| Gold | 19·3 | ·0316 | 1063 | 16·1 |
| Iron [cast] | 7·7 | ·119 | 1100 | 23·33 |
| Iron [Wrought] | 7·9 | ·115 | 1535 | — |
| Lead | 11·34 | ·03 | 327·3 | 6·3 |
| Marbie | 2·8 | ·21 | — | — |
| Nickel | 8·9 | ·11 | 1453 | 73·8 |
| Quartz | 2·66 | ·188 | 1750 | 260 |
| Silver | 10·5 | ·056 | 960·8 | 24·3 |
| Sodium | ·97 | ·295 | 97·7 | 27·5 |
| Tin | 7·3 | ·054 | 231·9 | 14·4 |
| Zinc | 7·14 | ·092 | 419·5 | 24·1 |

## MOH'S SCALE OF HARDNESS

| Substance | Hardness | Substance | Hardness |
|---|---|---|---|
| Talc | 1 | Rock-salt | 2 |
| Calcite | 3 | Fluorite | 4 |
| Apatite | 5 | Felspar | 6 |
| Quartz | 7 | Topaz | 8 |
| Corundum (Emery) | 9 | Diamond | 10 |

Bodies scratched by finger Nail, 2·5 or less

Bodies scratched by penknife, 6

Tabor [1954] has shown the relation log H = nM to hold for the first nine substances, where H is the indentation hardness in kg/mm, ²M is Moh's number and n is about 1·6

## HEAT UNITS AND DEFINITIONS

Temperature ( t or T ): Degree of hotness, usually measured on an arbitrary scale with an arbitrary zero. The common scales of temperature are the Celsius ( or Centigrade ) scale, the Fahrenheit scale and the Reaumur scale. The zero of the Celsius and Reaumur scales is the freezing point of water, while that of the Fahrenheit scale is the temperature of a mixture of common salt and ice.

| | Freezing Point of water | Boiling point of water. |
|---|---|---|
| Celsius ( Centigrade ) | 0°C | 100°C |
| Fahrenheit | 32°F | 212°F |
| Reaumur | 0°R | 80°R |

Conversion of Centigrade (C) to Fahrenheit (F)

$$F = \frac{C \times 9}{5} + 32$$

$$C = (F - 32) \times \frac{5}{9}$$

## RELATIVE HUMIDITIES FROM WET - AND DRY-BULB THERMOMETERS

### ( exposed in Standard Screen )

The relative humidity is defined as the ratio, expressed as a percentage, of the actual vapour pressure to the saturation vapour pressure at the temperature of the dry bulb. The dry bulb thermometer is an ordinary thermometer; the "wet-bulb" thermometer is similar in design and has its bulb enclosed in a wick, the other end of which dips into water. By capillary action the thermometer bulb is wet and under the usually encountered conditions evaporation of the water lowers the temperature of the bulb. The difference in reading of the two thermometers is the "Depression of the wet bulb". The tables below give relative humidities for various values of the dry bulb temperature and the depression. Temperatures are in degrees Fahrenheit.

## PERCENTAGE OF RELATIVE HUMIDITY

| Depression of wet bulb | Dry Bulb Temperature (°F) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 32° | 34° | 36° | 38° | 40° | 42° | 44° | 46° | 48° | 50° | 52° | 54° | 56° | 58° | 60° |
| | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % |
| 1°F | 89* | 90 | 90 | 91 | 91 | 91 | 92 | 92 | 92 | 93 | 93 | 93 | 94 | 94 | 94 |
| 2°F | 79* | 79 | 80 | 81 | 82 | 83 | 84 | 84 | 85 | 86 | 86 | 87 | 87 | 88 | 88 |
| 3°F | 69* | 70* | 70 | 72 | 73 | 74 | 75 | 77 | 77 | 79 | 79 | 80 | 81 | 82 | 82 |
| 4°F | .. | .. | 60 | 63 | 65 | 66 | 68 | 69 | 70 | 72 | 73 | 74 | 75 | 76 | 77 |
| 5°F | .. | .. | .. | 54 | 56 | 58 | 60 | 62 | 63 | 65 | 66 | 68 | 69 | 70 | 71 |
| 6°F | .. | .. | .. | 44 | 47 | 50 | 52 | 54 | 56 | 59 | 60 | 61 | 63 | 64 | 65 |
| 7°F | .. | .. | .. | .. | 39 | 42 | 45 | 47 | 49 | 52 | 54 | 55 | 57 | 59 | 60 |
| 8°F | .. | .. | .. | .. | 30 | 34 | 37 | 40 | 42 | 45 | 47 | 49 | 51 | 53 | 55 |
| 9°F | .. | .. | .. | .. | .. | 26 | 29 | 33 | 36 | 38 | 41 | 43 | 46 | 48 | 50 |
| 10°F | .. | .. | .. | .. | .. | 18 | 22 | 26 | 29 | 32 | 35 | 38 | 40 | 42 | 44 |

* *These values apply when the wet bulb is coated with ice and not with supercooled water.*

| Depression of wet bulb | Dry Bulb Temperature (°F) | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 62° | 64° | 66° | 68° | 70° | 72° | 74° | 76° | 78° | 80° | 82° | 84° | 86° | 88° | 90° |
| | % | % | % | % | % | % | % | % | % | % | % | % | % | % | % |
| 1°F | 94 | 94 | 95 | 95 | 95 | 95 | 95 | 95 | 95 | 96 | 96 | 96 | 96 | 96 | 96 |
| 2°F | 88 | 89 | 89 | 90 | 90 | 90 | 90 | 91 | 91 | 91 | 91 | 92 | 92 | 92 | 92 |
| 3°F | 83 | 83 | 84 | 84 | 85 | 85 | 86 | 86 | 86 | 87 | 87 | 87 | 88 | 88 | 88 |
| 4°F | 77 | 78 | 79 | 79 | 80 | 80 | 81 | 82 | 82 | 83 | 83 | 83 | 84 | 84 | 84 |
| 5°F | 72 | 73 | 74 | 75 | 75 | 76 | 77 | 78 | 78 | 79 | 79 | 79 | 80 | 80 | 81 |
| 6°F | 67 | 68 | 69 | 70 | 71 | 71 | 72 | 73 | 74 | 74 | 75 | 76 | 76 | 77 | 77 |
| 7°F | 61 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 70 | 71 | 72 | 72 | 73 | 74 |
| 8°F | 56 | 58 | 59 | 60 | 62 | 63 | 64 | 65 | 66 | 66 | 67 | 68 | 69 | 69 | 70 |
| 9°F | 51 | 53 | 54 | 56 | 57 | 58 | 60 | 61 | 62 | 63 | 64 | 64 | 65 | 66 | 67 |
| 10°F | 46 | 48 | 50 | 51 | 53 | 54 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 63 |
| 12°F | 37 | 39 | 41 | 43 | 44 | 46 | 48 | 49 | 50 | 52 | 53 | 54 | 55 | 56 | 57 |
| 14°F | 27 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 43 | 45 | 46 | 47 | 49 | 50 | 51 |
| 16°F | 18 | 21 | 23 | 26 | 28 | 31 | 33 | 34 | 36 | 38 | 40 | 41 | 42 | 44 | 45 |
| 18°F | 10 | 13 | 16 | 18 | 21 | 23 | 26 | 28 | 30 | 31 | 33 | 35 | 36 | 38 | 39 |
| 20°F | .. | 5 | 8 | 11 | 14 | 16 | 19 | 21 | 23 | 25 | 27 | 29 | 31 | 32 | 34 |

# VILLAGE POTTERY INDUSTRY

## CATEGORY WISE AND STATE WISE POTTERY POSITION AS ON 31-3-74

| | POTS AND PANS | | | | BRICKS | | | | TILES/PIPES | | | | GLAZED POTTERY | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units | Prodn. | Employ-ment | Wages | Units | Produ-ction | Employ-ment | Wages | Units | Produ-ction | Employ-ment | Wages | Units | Produ-ction | Employ-ment | Wages |
| Andhra Pradesh | 165 | 12 98 | 1002 | 2·85 | — | — | — | — | 2 | 0·51 | 39 | 0·21 | 1 | 0·24 | 20 | 0·10 |
| Assam | 12 | 2·89 | 254 | 1·99 | 1 | 0·27 | 71 | 0·11 | 2 | 0·59 | 50 | 0·39 | — | — | — | — |
| Bihar | 182 | 15·03 | 1983 | 6·87 | 6 | 7·28 | 1006 | 2·63 | 11 | 1·57 | 103 | 1·02 | — | — | — | — |
| Gujarat | 84 | 38·15 | 1875 | 14·08 | 3 | 3·40 | 88 | 0·85 | 5 | 1·27 | 58 | 0·50 | — | — | — | — |
| Haryana | 276 | 14·29 | 831 | 9·87 | 43 | 44·17 | 2783 | 5·77 | — | — | — | — | 2 | 2·16 | 47 | 0·53 |
| Himachal Pradesh | 162 | 3·97 | 329 | 2·93 | 11 | 17·35 | 1375 | 10·98 | — | — | — | — | — | — | — | — |
| Jammu & Kashmir | 29 | 7·59 | 480 | 3·19 | 5 | 2·84 | 241 | 0·50 | — | — | — | — | — | — | — | — |
| Karnataka | 245 | 22·10 | 3160 | 12·68 | — | — | — | — | 5 | 1·46 | 156 | 0·36 | — | — | — | — |
| Kerala | 146 | 40 12 | 3724 | 27·54 | 1 | 0·14 | 201 | 0·16 | 3 | 1·16 | 59 | 0·37 | 1 | 0·25 | 13 | 0·08 |
| Madhya Pradesh | 4 | 0·13 | 36 | 0·07 | 10 | 00·82 | 151 | 0·16 | 2 | 00·04 | 29 | 0·05 | — | — | — | — |
| Maharashtra | 113 | 25 00 | 5838 | 12·16 | 2 | 0·72 | 38 | 0·24 | 9 | 18·43 | 694 | 3·06 | 3 | 3·17 | 101 | 1·20 |
| Manipur | 5 | 1·02 | 82 | 0·71 | 2 | 3·16 | 153 | — | — | — | — | — | — | — | — | — |
| Orissa | 37 | 1·37 | 377 | 0·63 | 9 | 1·55 | 245 | 0·47 | 5 | 1·14 | 220 | 0·41 | — | — | — | — |
| Punjab | — | — | — | — | 34 | 37·84 | 2465 | 12·93 | — | — | — | — | — | — | — | — |
| Rajasthan | 55 | 17·21 | 3257 | 11·28 | 6 | 8·38 | 955 | 2·33 | — | — | — | — | — | — | — | — |
| Tamil Nadu | 446 | 24·49 | 2548 | 16·42 | 1 | 1·06 | 73 | 0·33 | 1 | 0·14 | 14 | 0·09 | 3 | 0·39 | 18 | 0·12 |
| Tripura | 2 | 00·04 | 4 | 00·01 | — | — | — | — | — | — | — | — | — | — | — | — |
| Uttar Pradesh | 187 | 13·07 | 1418 | 6·66 | 42 | 39·72 | 7819 | 12·90 | 15 | 1·83 | 199 | 0·59 | 4 | 1·53 | 140 | 0·52 |
| West Bengal | 5 | 00·87 | 97 | 00·42 | 7 | 4·02 | 397 | 1·90 | 20 | 1·54 | 176 | 7·73 | 15 | 8·54 | 351 | 2 81 |
| Delhi | — | — | — | — | 2 | 2·31 | 66 | 0·64 | — | — | — | — | 1 | 0·80 | 12 | 0·26 |
| | 2155 | 240·32 | 27295 | 130·36 | 185 | 175·03 | 18127 | 54·43 | 80 | 29·68 | 1797 | 7·73 | 15 | 8·54 | 351 | 2·81 |

| | No. of units | Production Rs. in lakhs | Employment No. | Wages Rs. in lakhs |
|---|---|---|---|---|
| Pots & Pans | 2155 | 240·32 | 27,295 | 130·36 |
| Bricks | 185 | 175·03 | 18,127 | 54·43 |
| Tiles and Pipes | 80 | 29·68 | 1,797 | 7·73 |
| Glazed Pottery | 15 | 8·54 | 351 | 2·81 |
| Grand Total | 2435 | 453·57 | 47,570 | 195·33 |

## SOME CERAMIC PUBLICATIONS

| Name of the Book | Name of the Author |
|---|---|
| How to do Ceramics. | Hellen H. Lion |
| A book of Pottery from Mud into immortality. | Hendry Varnum Poor. |
| Design for Industry. | Government of India, Small Scale Industry. |
| Stone-ware and Porcelain.. | Daniel Rhodes. |
| Enameling for beginners. | Edward Winter. |
| Design for Industry. | Government of India, Small Scale Industry. |
| The complete Book of Pottery making. | John B. Kenny. |
| Pottery. | Delmar W. Olson. |
| Transanctions of the Indian Ceramic Society. | S. N. Prasad. |
| Pottery Materials & Techniques. | David Green. |
| Pottery Making & Decorating. | Reginald Marlow. |
| Making Pottery | Walter De Sager. |
| Ceramics – Physical & Chemical Fundamentals. | Herman Salmanj. |
| The efficient use of fuel. | Her Majesty's Stationery Office. |
| Domestic & Commercial Oil Burners. | Burkhardi C. H. |
| China Decoration. | Kathleen Mann. |
| Pilot Project on Pottery. | PRAI – Lucknow. |

| Name of the Book | Name of the Author |
|---|---|
| Pottery Making from the Ground up. | York Honore. |
| Ceramics. | J. S. P. Jenmer D. T. N. Kent |
| Bricks and Modern Research. | B. Button Worth. |
| चीनी मिटी का उद्योग | Om Prakash. |
| Technical Faults in Porcelain Manufacture and their climination. | T. N. Sharma. |
| Pottery and Porcelain. | L. M. Angus - Butterworth. |
| Magan Choola. | J. C. Kumarappa. |
| Ceramics – Vol – I | Edward P. McNamara. |
| Fundamentals of Ceramics (Second Edition). | —do— |
| Physical & Mathematical Tables. | John B. Clark. |
| Weights & Measure Calculator in Metric System. | S. K. Mehra. |
| Ceramics (An illustrated guide to Creating and Enjoying Pottery). | Vincent A. Roy. |
| Creative Ikebana a new way with flowers. | Nasiks Ohno. |
| Elements of Ceramics. | F. H. Norton. |
| Mechanics. | L. R. Middleton. |
| Heat. | W. G. Davis. |
| Indian Pottry. | S. K. Mirmira. |

| Name of the Book | Name of the Author |
|---|---|
| Building Materials. | V. A. Vorobyer. |
| Making Pottery figures. | Marjorie Dru - Bell. |
| Water supply engineering. | R. S. Deshpande. |
| Pottery today. | Denys Val Baker. |
| Story of Pottery and Glass. | Herberth Arthur. |
| Clays Their Properties, Uses and Occurrences in India and Pakistan. | M. L. Misra. |
| Clay Works Hand Book. | Alfred B. Searle. |
| Industrial Chemistry Coal C Carbonisation. | —do— |
| Ceramics Clay Technology. | Wilson. |
| Heat Transmission. | William H Mc Adam. |
| Pottery Craft. | J. A. F. Divine & G. Black Ford. |
| Ceramic Tests and Calculations. | A. I. Andrews. |
| Modern Pottery Manufacturing. | H. N. Bose. |
| Furnaces. | J. D. Gilchrist. |
| Fuel - The conquest of Man's Environment. | E. C. Roberson and Roy Herbert |
| Porcelain through the Ages. | George Savoge. |
| Porcelain. | —do— |

| Name of the Book | Name of the Author |
|---|---|
| General Principle of Geology. | J. F. Kirkaldy. |
| Modern Porcelain. | Alberta C. Trimble. |
| Cermets (Complete information on properties, forming, processing testing and uses. | Edited :- Jr. Tinklepaugh and W. B. Grandall. |
| Bricks & Tile Engineering. | Harry C. Plummer. |
| Introduction to Ceramics. | W. D. Kingery. |
| An introduction to Physical Geology. | W. J. Miller. |
| The Design and Correction. | L. R. Whitaker. |
| Answers to Drying Trouble. | L. R. Whitaker. |
| Ceramics. | P. William Lee. |
| Ceramics Glazes. | C. W. Parmelee. |
| Factory Design and Equipment Manufacture of Clay Wares. | T. W. Garve. |
| Creative Ceramics. | Katherino Morris Lester. |
| Mritika Udyog (Hindi) | H. N. Bose. |
| Engineering Materials Hand Book. | Charles L. Mantell. |
| The Technic of Pottery. | Dora M. Billington. |
| Physics and Chemistry of Ceramics. | Edited : Cyrus Klings Burg. |

Fig. No. 55

*Parts of wheel attachment.*

COMMUNITY HEALTH CELL
326, V Main, I Block
Koramangala
Bangalore-560034
India

Fig. No. 56

## A GLANCE AT THE PROGRESS
## VILLAGE POTTERY INDUSTRY
## KHADI AND VILLAGE INDUSTRIES COMMISSION

| | 1960–61 | 1965–66 | 1970–71 | 1972–73 | 1973–74 |
|---|---|---|---|---|---|
| I. Organisations : | | | | | |
| i) Institutions | 38 | 110 | 343 | 419 | 445 |
| ii) Co-operative | 609 | 1,706 | 2,015 | 2,213 | 2,240 |
| Total | 647 | 1,816 | 2,358 | 2,632 | 2,685 |
| II. Production (Rs. crores) | 0·42 | 1·34 | 2·67 | 3·90 | 4·52 |
| III Sales (Rs. crores) | 0·28 | 1·27 | 2·72 | 3·90 | 4·64 |
| IV. Employment (000's) | | | | | |
| i) Full time | 11 | 15 | 22 | 36·75 | 27·22 |
| ii) Part time | 9 | 10 | 19 | 22·98 | 20·20 |
| Total | 20 | 25 | 41 | 59·73 | 47·42 |
| V. Wages (Rs. crores) | 0·23 | 0·67 | 1·32 | 1·80 | 1·89 |

## STATE KHADI AND VILLAGE INDUSTRIES BOARDS.

1. Andhra Pradesh
   Kachiguda,
   Hyderabad-500 027 (A.P.)

2. ASSAM
   Chandmari, Gauhati-3
   (Assam).

3. Bihar
   Gandhi Maidan (East),
   Patna-4 (Bihar).

4. Gujarat Rajya
   Green Villa, Juna Wadaj,
   Ahmedabad-13 (Gujarat).

5. Haryana
   Kothi No. 53, Sector No. 2-B,
   CHANDIGARH.

6. Himachal Pradesh
   Laj Bhavan, Cart Road,
   Simla-1 (H. P.).

7. Madhya Pradesh
   Industrial Estate,
   Govindpura, Bhopal-23
   (M. P.)

8. Jammu & Kashmir
   Old Secretariat,
   Srinagar (Kashmir)

9. Kerala
   Trivandrum (Kerala).

10. Karnataka
    6, Seshadri Road,
    Bangalore-9 (Karnataka).

11. Manipur
    Poona Road,
    Imphal (Manipur).

12. Maharashtra
    Bhatia Balrakshak Vidyalaya,
    19-21, Manohardas Street,
    Fort. Bombay-400 001. (M.S.)

13. Orissa
    Khavabela Nagar,
    Bhubaneswar, Dist. Puri
    (Orissa).

14. Punjab
    41-2 A,
    Chandigarh-1 (Punjab).

15. Rajasthan
    Station Road, Jaipur
    (Rajasthan).

16. Tamil Nadu
    Kuralagam Building,
    Madras-1 (Tamil Nadu)

17. Tripura
    Colonel Chowmuhani,
    Agartala (Tripura).

18. Uttar Pradesh
    7/105, C, Tilak Nagar,
    Kanpur-2 (U. P.)

19. Union Territory of Chandigarh
    Secretariat,
    Chandigarh (Punjab).

20. West Bengal
    12 B. B. D. Bag,
    Calcutta-1 (W. B.)

## STATE OFFICES

### KHADI AND VILLAGE INDUSTRIES COMMISSION

1. Sriniketan, P. B. No. 259,
   Tilak Road, HYDERABAD-1
   ANDHRA PRADESH

2. G. N. Bardoloi Road,
   Ambari, Gauhati-1
   (ASSAM)

3. 11-B, Kidwaipuri, Patna-1
   (BIHAR)

4. Pary's Hotel, Staff Road,
   P. B. No. 34, Ambala Cantt
   (Haryana).

5. Karan Nagar,
   Srinagar,
   ( JAMMU & KASHMIR )

6. 6, Dr. D. V. Gundappa Road,
   P. B. No. 496, Gandhi Bazar,
   Bangalore-4 (Karnataka).

7. T. C. 23/1287, Dharmalayam
   Road, Thampanoor,
   Trivandrum (Kerala).

8. 44/45, Shopping Centre,
   New Market,
   Bhopal-3 (M. P.)

9. Unit :- III New Capital
   Bhubaneshwar-1 (Orissa).

10. Hira Bagh, Sawai Ram
    Singh Road, Jaipur-4
    (Rajasthan).

11. Out House Building,
    10, Raman St. T. Nagar,
    MADRAS-17 (TAMIL NADU)

12. Lajpat Rai Bhavan,
    Kaiserbagh,
    LUCKNOW-1 (U. P.)

13. 33, Chittaranjan Avenue,
    Calcutta-12 (W. Bengal).

### HILL, BORDER AND TRIBAL AREAS

1. Regional Office,
   Khadi & V. I. Commission,
   Uttarkashi [U. P.]
   Tel : 11

2. Regional Office,
   Khadi & V. I. Commission,
   Shakuntala Road,
   Agartala [Tripura].
   Tel : 435

3. Regional Office,
   Khadi & V. I. Commission,
   Gauhati [Assam].

4. Regional Office,
   Khadi & V. I. Commission,
   Pithoragarh [U. P.].
   Tel : 101



839

COMMUNITY HEALTH CELL
47/1, (First Floor) St. Marks Road,
Bangalore - 560 001.

5. Regional Office,
Khadi & V. I. Commission,
Magwai Mohalla,
Mandi [H. P.]
Tel. 174

6. Regional Office,
Khadi & V. I. Commission,
Baheti Bhavan, Rani Bazar,
Bikaner [Rajasthan].
Tel. : 688

7. Regional Office,
Khadi & V. I. Commission,
Kohima [Nagaland]
Tel. : 752

8. Regional Office,
Khadi & V. I. Commission,
Laxmi Bhavan, Hill Cart Road,
Siliguri [West Bengal].
Tel. : 1735

9. Regional Office
Khadi & V. I. Commission,
Sunderban Development
Scheme, P. O. Hingalgonj,
Dist. 24 Parganas,
[West Bengal].

10. Regional Office,
Khadi & V. I. Commission,
Port Blair [Andaman & Nicobar Islands].

11. Regional Office,
Khadi & V. I. Commission,
Jeypore Road, Opp. Industrial Centre, Jagdalpur,
Dist. Bastar [M. P.].
Tel. : 240

12. Regional Office,
Khadi & V. I. Commission,
Raigadi, Near Power House,
Radhanpur,
Dist. Banaskantha [Gujarat].
Tel. : 74

13. Regional Office,
Khadi & V. I. Commission,
Station Road, Margao [Goa].
Tel. : 2125

14. Regional Office,
Khadi & V. I. Commission,
B. T. Road, Imphal,
[Manipur].

## Addresses of some manufacturers and suppliers of equipment and materials for Pottery Industry;

1. Kusum Engineering Works
25, Swallow Lane,
Calcutta-1.

2. St. Joseph's Asylum Industrial Works shop
P. B. No. 502,
Mangalore : 575002
(Karnataka)

3. Mooken Mills Engineering Company, Poothole
Trichur-4 (Kerala).

4. Lloyd Engineering Company
86/4 A, Surendranath Banerjee Road, Calcutta-14.

5. The Mechanical Engineering Works,
Feeder (Gamdevi) Road,
Bilimora (W. Railway)
Gujarat.

6. Shri Lokamanya Engineering Works, 26, Bharatkhand cotton mills compound,
Naroda Road,
Ahmedabad-16.

7. Xavier Foundry
Sankarayya Road
Trichur-4. (Kerala).

8. St. Vincent's Industrial Work Shop
Chalappuram, Kozhikode
(Kerala)

9. Janata Machanical Works,
ChottaBazar,
Chanda (Maharashtra).

10. Baranagore Bross Foundry
165, Kunthighat Road,
Calcutta-36.

11. Pathak Engineering Works
Opp. Delhi Gate,
Devimandir Road,
Gaziabad (U. P.)

12. M/s. Khurja Engineering Corporation
5001, Radhakrishna Street,
KHURJA (U. P.)

13. The Dragon Iron Works,
31, Kisonlall Burman Road,
Salkia, Howrah-6.

14. Diana Dice & Machine Fitters
Haziganj, Patna-8 (Bihar).

15. Gorecha Engineering Works
Ravapara,
Morvi (Gujarat).

16. Blacksmithy & Carpentary workshop
Khadi & Village Industries Commission
DAHANU
Dist. Thana (Maharashtra)

17. Central Village Pottery Institute, Khadi & V. I. Commission Khanapur,
Dist. Belgaum (Karnataka)

18. Gramodaya Sangh
BHADRAWATI
Dist. Chanda (Maharashtra)

19. M/s. Wireless Amateures,
481/10, Patil Weaving factory Compound,
ICHALKARNJI
Dist. Kolhapur (Maharashtra)

20. Therlec (Pvt.) Ltd.,
Wagle Industrial Estate,
Thana (Bombay).

21. M/s. Parli tile works
Post. Parli, Dist. Palghat
(Kerala).

22. Ceramic Proudcts Ltd.
Khanapur, Dist. Belgaum
(Karnataka).

23. Jaycee Traders
16, Satkartar Society
86, Ghod Bundar Road
Khar, Bombay-400052.

24. M. Baker & Company
35, Nagdevi Street
Bombay-400003.

25. The Ganga Glass Works (P.) Ltd.,
Vishnu Nagar, Po. Balawali
Dist. Bijnor (U.P.)

*Pottery well-rings are popular in sandy place. This scheme in Bar peta (Assam).*

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